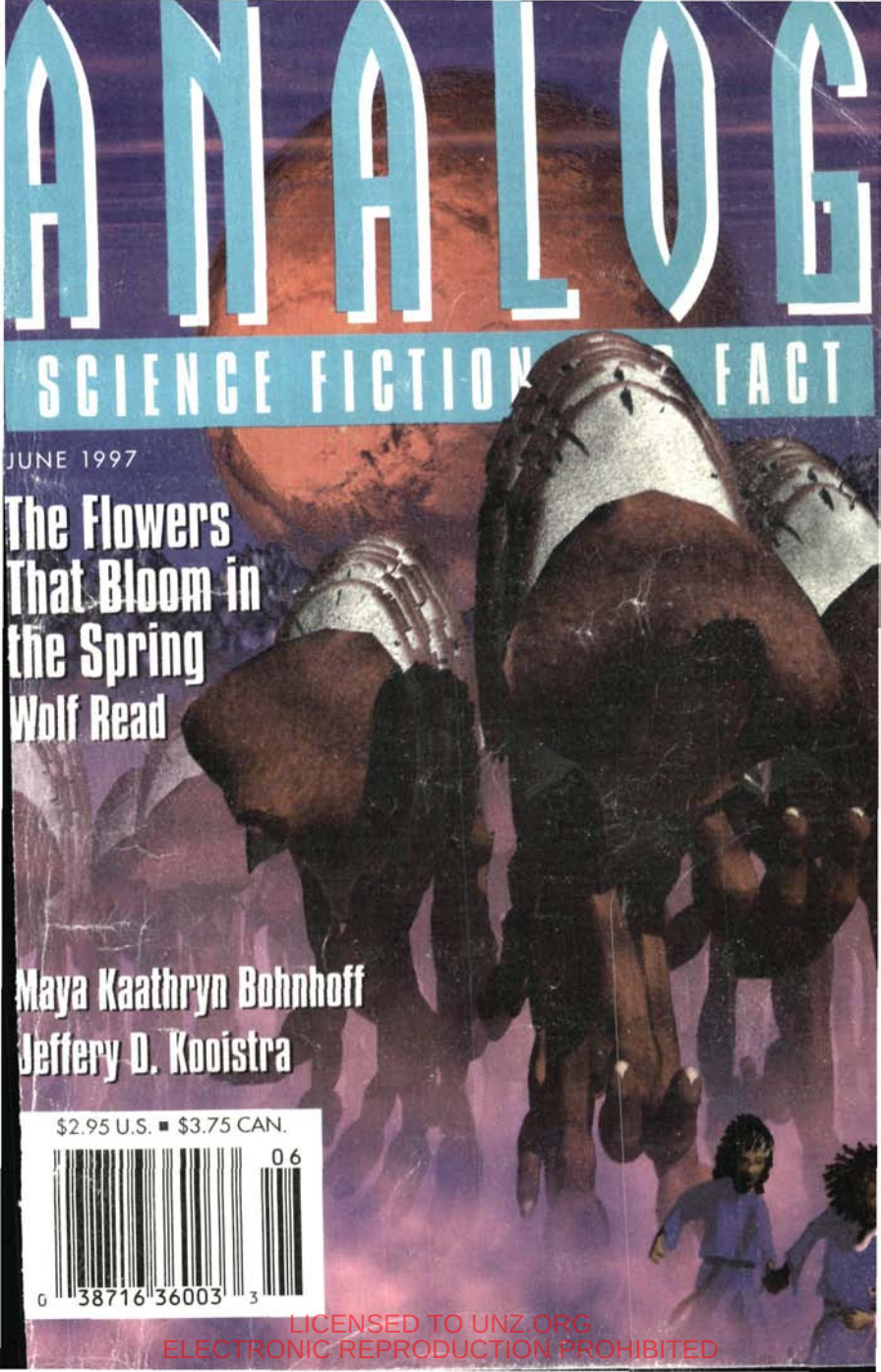

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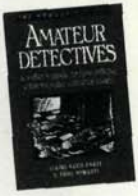

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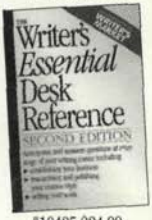

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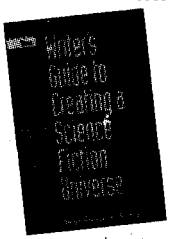

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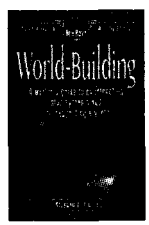

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Vol. CXVII No. 6
June 1997

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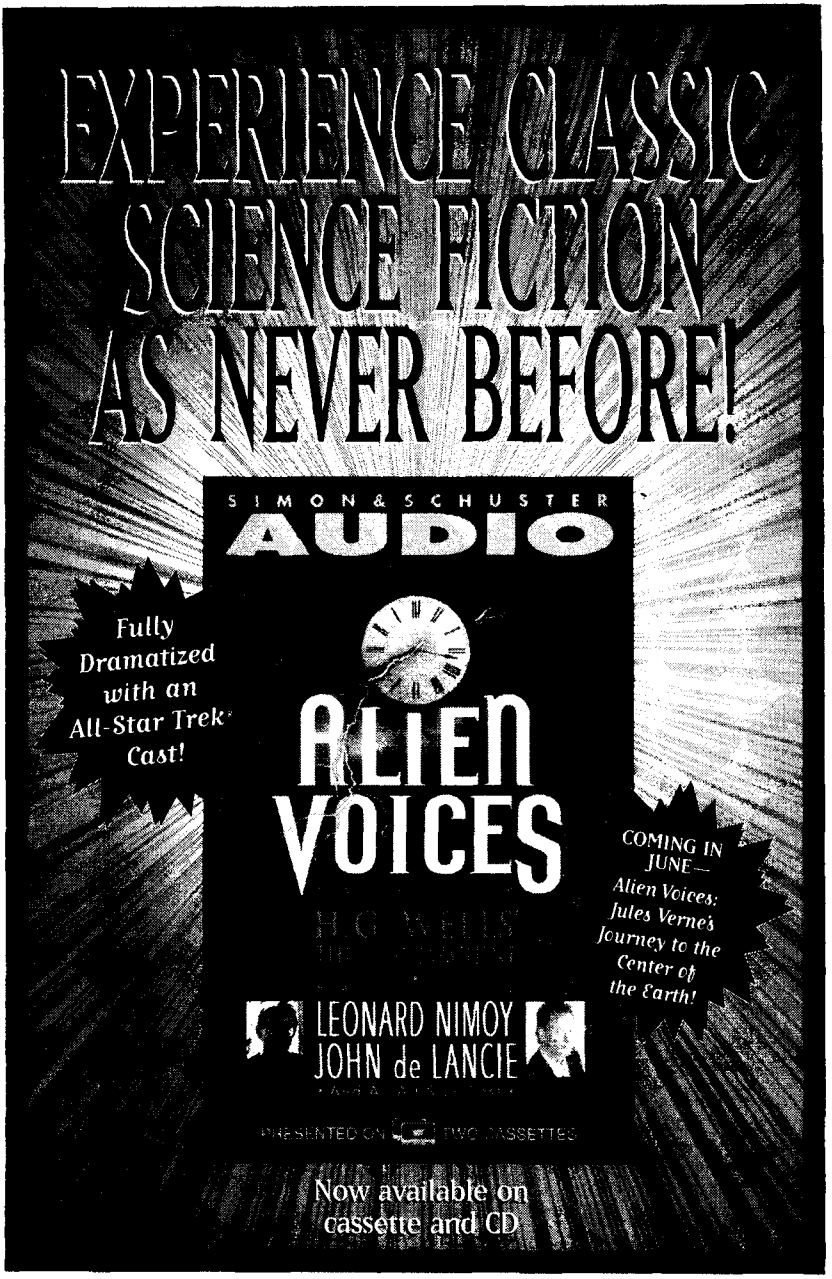
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EDITORIAL Stanley Schmidt

NEW ATTITUDES FOR NEW FRONTIERS

A year and a half ago (November 1995) Robert Zubrin had an article in *Analog* called "The Martian Frontier." In it he outlined "Mars Direct," his proposal (now widely known) for a relatively inexpensive way to colonize Mars. He also discussed at some length why we might *want* to colonize Mars, among other things citing Frederick Jackson Turner's famous views on the importance of the frontier to the development of a distinctively American culture (and its incidental salubrious effects on European culture). Mars, he argued, could play a similar role now, with similar benefits both for the colonists and for those who remained on Earth.

Many readers were enthusiastic, but a few found the article disturbing. One counterargument was that the Turner hypothesis is "discredited" or even "disproved"; but in a field where relationships are as complex and standards of proof as nebulous as they are in history, I think that claim may be too strong, premature, or both. In the "soft sciences" even more than in the "hard," "discredited" is often more a matter of "out of fashion" than "disproved"—and fashions come, go, and sometimes return. It seems to me that the Turner hypothesis is worth reexamination and perhaps a bit of updating, particularly in view of Zubrin's observations on the cultural malaise that seems to have overtaken us during the decades we have been without a frontier.

The other main category of objections is a bit harder to answer: "What about the Indians?"

One reader in particular, himself working as a teacher on an Indian reservation, was disturbed that Zubrin's article made no mention of the Indians (or, as I will henceforth more accurately call them, Amerinds). "Sitting Bull *et al.*," he wrote, "would certainly have disputed the claim that frontier lands were 'free,' and that America considered human life infinitely precious."

He's certainly right about that, and with hindsight, I would agree that "The Martian Frontier" *should* have mentioned the Amerinds, though doing the problem (and the Amerinds) justice would have required far more

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of a digression than the article could have accommodated in the available pages. It's a big, important subject in itself, and far from simple. And I can't entirely agree with some of the critics' conclusions about what it implies for the basic argument about the value of a frontier.

The reader I cited, and others with similar views, objected to the argument that, "The problem with [European] Christendom was . . . not that there were insufficient natural resources to go around . . . the problem was that all the resources were *owned*. . . . The New World changed all that by supplying a place in which there were no established ruling institutions, an improvisational theater big enough to welcome all comers with no parts assigned."

Nonsense, said the critics. One of them imagined a future historian commenting on the article thus: "Several movies and books about native American history were quite popular at that time, and even the most superficial knowledge of that history would have sufficed to show that the Frontier lands belonged to the *Indians*, and that the succession of genocides by which their lands were stolen made a mockery of America's supposed respect for human life."

Well, yes, *but* . . .

It would be impossible to deny that the record of white settlers' treatment of Amerinds, and other tribal peoples in other parts of the world, has been largely a shameful one. I could easily fill a book with it (as many others have), from outright, literal genocide to forced education based on alien values. That is one set of facts—but it is not as simple as it sounds, and it does not automatically invalidate the arguments of Zubrin and others for the potential value of a new frontier, on Mars or elsewhere.

Another set of facts is that the frontier really *did* lead to an unprecedented climate of opportunity, inspiration, innovation, and respect for human life and individualism *within the colonizing cultures*. The mistake they made (admittedly a dilly) was in failing to recognize that the native peoples already on the land they were colonizing were just as human as they themselves, and just as deserving of respect. It's obvious to *us,* with our 20/20 hindsight and extra century or so of perspective, that that view was very seriously wrong. It was *not* obvious to many of them, and it is not entirely reasonable to condemn whole

Analog Science Fiction and Fact (Astounding) is published monthly except for a combined July/August double issue by Dell Magazines, a division of Crosstown Publications. One-year subscription for $33.97 in the U.S.A. and possessions, in all other countries, $41.97 (GST included in Canada, GST # 123054108) payable in advance in U.S. funds. First copy of new subscription will be mailed within eight weeks of receipt of order. When reporting change of address allow 6 to 8 weeks and give new address as well as the old address as it appears on the last label. Periodical postage paid at New York, NY, and at additional mailing offices. Canadian postage paid at Windsor, Ontario. Canada Post International Publications Mail, Product Sales Agreement No. 260622. © 1996 by Dell Magazines, a division of Crosstown Publications, all rights reserved. Protection secured under the Universal Copyright Convention. Reproduction or use of editorial or pictorial content in any manner without express permission is prohibited. All stories in this magazine are fiction. No actual persons are designated by name or character. Any similarity is coincidental. All submissions must be accompanied by stamped self-addressed envelope, the publisher assumes no responsibility for unsolicited manuscripts or artwork. USPS 488-910, ISSN 1059-2113

POSTMASTER: Send change of address to: ANALOG SCIENCE FICTION AND FACT
P.O. Box 54625, Boulder, CO 80322-4625.
IN CANADA RETURN TO: 3255 WYANDOTTE STREET EAST, WINDSOR, ONT. CANADA N8Y 1E9
Editorial and Advertising: Analog Science Fiction and Fact, 1270 Avenue of the Americas, New York NY 10020
Subscriptions: Analog Science Fiction and Fact, P.O. Box 54625, Boulder, CO 80322-4625

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cultures for violating moral principles they had not yet learned to understand. (I commented at greater length on this in "Ex Post Facto Ethics," October 1992.)

The issue was further complicated by a fundamental gulf between European and Amerindian ways of looking at things. In the words of N. Scott Momaday, himself an Amerind, writing in the National Geographic Society's *The World of the American Indian*, "There is on the part of most people in our society a tacit assumption that the land is a commodity, an object of trade and utility. But for the Indian this is a false view, a failure to imagine the landscape truly, in its own terms. The landscape cannot be appropriated to individual ownership. Rather it is there for all men alike, as a dimension in which they have existence with other creatures."

In other words, the concept of "ownership" of land was intrinsically alien to Amerindian thinking, just as the concept of everyone sharing in it and "living in harmony with it" was alien to Europeans. Thus it is hardly surprising if Europeans felt free to "join in," or if Amerinds were slow to recognize what they were up against. Each group saw things in a way so fundamentally different from the other that it had trouble seeing how things looked to the other. To Europeans, it was hard to think of the land as "belonging to the Indians" when even the Indians didn't see it as belonging to any *particular* Indians. To the Indians, the idea that someone else would think of land as something that *could* be owned and bought and sold was hard to grasp.

Of course, it wasn't *all* ignorance. Europeans and their descendants real-

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First issue of Astounding January 1930 ©

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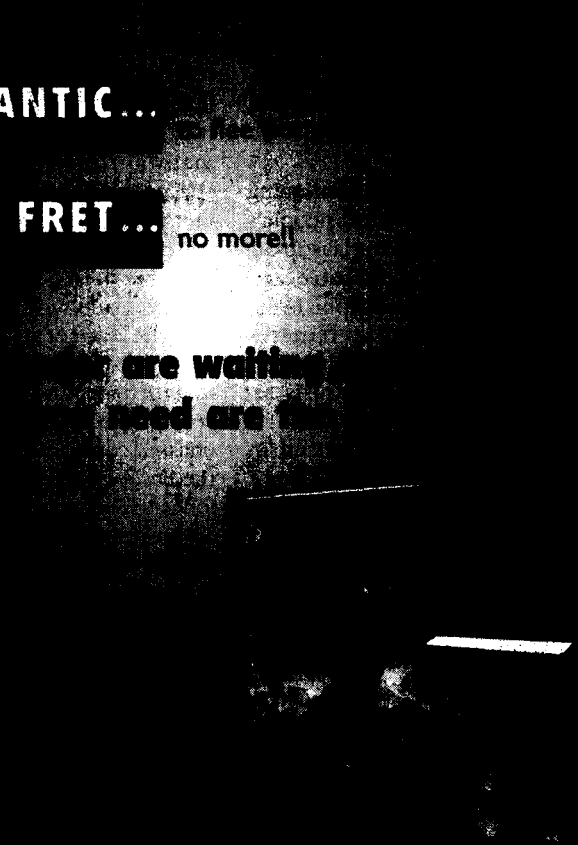

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ly did often convince themselves, frequently by twisting Christian beliefs to fit their desires, that what they wanted somehow served a "higher purpose" than what the Amerinds wanted. Thus John Quincy Adams could ask quite seriously, "What is the right of a huntsman to the forest of a thousand miles over which he has accidentally ranged in quest of prey? . . . Shall the lordly savage not only disdain the virtues and enjoyments of civilization himself, but shall he control the civilization of a world?" All of which sounds colossally and embarrassingly arrogant to most of us now. But then, that's all in the past.

Or is it?

One critic wrote, "The continuing worldwide robbery of tribal people's lands shows that the materialistic desires of rich nations are insatiable, and that rich nations will insist upon living in luxury even if doing so requires them to dispossess and kill the poor, whom they will simultaneously resent, fear, and despise."

There is undoubtedly some truth in this. But how much, and what does it have to do with the Martian frontier or others that may lie beyond? Does the fact that "civilized" peoples have in the past committed atrocities against "uncivilized" peoples, and that some still do, mean we should renounce forever the desire to expand into space?

Some apparently think so, but the conclusion seems to me unwarranted, unnecessarily cynical, and under some circumstances a complete *non sequitur*.

In the first place, arguments against space exploration or colonization based on How We Might Mistreat Native Peoples are simply irrelevant in cases where there *are* no native peoples. This is likely to be true in many cases, almost certainly including Mars.

In the second place, even in cases where there are native peoples, is it necessary to assume that the evils of the past will be repeated? Admittedly they *could* be, and some would be tempted. It might take great care and effort to avoid them, but are we really totally incapable of learning from history? I refuse to believe that. Yes, our learning has been slow and fitful, but it has sometimes occurred. I would maintain that we *should* go into space, and that the possibility of contact with other species is one of the reasons for doing so.

Those who go should, of course, first be made well aware of past evils and the danger of repeating them. They must also make a special effort to anticipate, and train themselves to recognize, possible new cultural chasms comparable to that between the European idea that Everything Belongs to Somebody and the Amerindian idea that Nothing Belongs to Anybody. Those past evils and the associated dangers, both to us and to anyone we might meet, are far from trivial. If we venture into a situation where we might meet Others, we must take very seriously the responsibility of not letting similar atrocities happen again. But that is not at all the same as saying we must avoid them by shunning all contact.

Finally, I must concede that some who doubt Zubrin's arguments for

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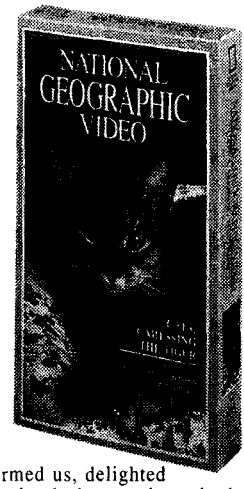

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the value of a Martian frontier do not go so far as to say that their reservations mean we should abandon dreams of space travel. At least one of them did, however, say, "Unless we renounce materialism, humanity will people the stars with spiritually unhealthy individuals whose rapacity and lack of compassion will make them the bane of the Universe." He further speculates that the Fermi paradox may be explained if ". . . when civilizations become advanced enough for interstellar flight, they might also realize that it's not a route to true happiness. Consequently, they might devote their energies to spiritual affairs, thereby gaining fulfillment without leaving their home worlds."

Well, maybe. But the fact remains that any species that voluntarily restricts itself to one world makes itself—*all* of itself—very vulnerable to the kinds of events that have totally eradicated whole species several times in our own planet's past. If you're extinct, I suspect, spiritual affairs become considerably less fulfilling. I realize some may disagree even with that, but for myself, I'll opt for survival—and even a certain amount of physical well-being.

Inconvenient as some people whose primary focus is "spiritual" may find it, we *are* at least partly material beings. Making the pursuit of material goods your *sole* goal in life is an unhealthy business, but so is pretending the material side of our nature can be ignored. If you think about how crotchety you can get when your lunch has been delayed by a few hours, you may begin to dimly imagine how it would feel to live in a society where *everybody* was *always* really, seriously hungry. I respectfully submit that you might actually be in a better position to concentrate on your spiritual side if you don't have to spend all your life trying to meet minimal material needs.

That's one of the things a new frontier could do for us—but it's not the only one. Yes, it will take some doing to figure out *how* to bring the benefits to human civilization as a whole rather than just a wealthy few, and we will need to work hard to learn to respect any other civilizations we might meet.

But it's worth doing. Material goods are only one of the benefits new frontiers can offer. The possibilities of experiencing parts of the grandeur of the Universe previously only dimly imagined, of learning that we can achieve things beyond our ancestors' wildest dreams, and possibly even of meeting and sharing views and insights with new kinds of intelligence seem to me as "spiritual" as anything.

What we need is not to shy away from new frontiers because our ancestors often approached them with bad attitudes. What we need is to approach them with new attitudes, appropriate attitudes, built on the foundation of what we have learned from past mistakes. ■

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THE FLOWERS THAT BLOOM IN THE SPRING

Experience is the best teacher—
but not the gentlest!

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Men argue; Nature acts.
—Voltaire

"All right, let's bag the thing!" Wildwind called. He grabbed the controls to the ATV's projectile weapon.

Angered, Annwn reached over and slapped his hands away. "How can you do that?"

Wildwind looked indignant. "It could be dangerous!"

"We're here on an exploratory mission."

"So?" He crossed his arms.

"So," said Miranda, sitting behind the two arguers, managing the communications and navigation controls, "that means we're supposed to determine things, not jump to conclusions."

"Yeah, but how can we explore if some beast sucks us into its gullet!"

"That's the risk we take, right?" said Annwn, becoming tired of the argument. "No shooting. Period."

Wildwind looked at Kwazar, who wisely shrugged.

He sighed, giving in.

Annwn smiled inwardly. She liked to see Wildwind defeated.

A jarring report echoed from the front of the vehicle. Annwn found herself thrown into the dash as emergency airbags erupted throughout the compartment. The ballooning bags forced her back into her seat. Hissing quietly, the safety devices deflated.

"OK, what happened?" Annwn asked angrily, even though she already knew. The argument had distracted her, and she had let the vehicle hit something.

"We've smacked a rock, I believe," came Miranda's nervous reply.

"A rock?!" She felt bad, but couldn't help her temper; so many things had gone wrong! "Why didn't you warn me? And what happened to the proximity alert?"

Miranda, face partially hidden by limp airbags, looked unhappy. "The argument distracted me. I'm sorry."

"Well, we're all sorry now, aren't we?" Annwn said, unable to help the harsh tones toward her friend. "Who's going to fix the—"

"We've trouble!" called Wildwind as he grabbed the weapon's controls.

"Now what? Hands off the gun!"

Wildwind slammed the trigger. THUMP!

Angered beyond speech, Annwn's face heated up.

Wildwind calmly stared at his exterior display. "Dammit, I only winged—"

The impact shook the vehicle as if it were a frail bubble convulsing in the wind. Bulging inward, the right-hand wall shrieked the grating wail of abused metal, throwing built-in consoles and keypads into Wildwind's lap while scattering debris across the floor.

Kwazar calmly said, "That beast is attacking our vehicle."

"Shit!" Wildwind gave both the smashed computers and Annwn the evil eye. "I would have killed the thing earlier!" He threw wrecked consoles across the cab, some of which destructively collided with the navigation controls. Nearly struck by the missile, Miranda screamed.

Annwn unstrapped and moved toward Wildwind, balling her small

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right hand into a fist. "I've had enough of—"

The vehicle shuddered under another massive impact, flipping onto its side. Annwn fell into the wall to her left, which had become the floor. Heavy padding protected her from injury.

She heard Wildwind's infuriating laugh.

Bang! What had been the floor folded inward, sending Wildwind's chair into the ceiling now serving as a wall. The chair's high top protected him, a great disappointment to Annwn. Behind Wildwind, she could see Miranda holding the seat-rails tightly, her face a mask of fear. Kwazar looked disturbingly calm. His apathy left Annwn very frustrated. He seemed to be calmly waiting for the inevitable.

Why not? she realized. *It's happened many times before. . . .*

With yet another ear-ringing crash, Wildwind's seat buckled as the floor caved inward. He unstrapped and dropped next to a sprawling Annwn. Looking down, he said, "Let me get a hand weapon. We've got to do something." He looked unhappy at having to ask permission. *Good,* she thought. *Let him squirm.*

"No. This beast will lose interest soon enough."

"Right," he said sarcastically. "We don't know what the animal will do." He turned around and walked toward the rear, ducking under the bent seat.

Enraged at his lack of respect for her authority, she launched herself toward his feet. He lost balance as she wrapped her long arms around his ankle. Falling forward, he landed close to the small-arms locker. With a stretch, he had the door open. "Ha!" he said as he reached for a pistol.

Annwn stood up, intending to walk over him and grab the handgun. The creature, whatever it was—she never even bothered to look, assuming that it was an overgrown hallucihexadon, or a monopouncer—had other things in mind, and slammed into the vehicle again. Behind her, the windshield crashed inward, mashing the seat she had occupied. The shock pushed her to the "floor." She cried out in rage.

Wildwind tried the rear-hatch controls. The mechanism had failed. "Damn!" he called out, giving the door a hard kick. "I'll shoot the thing open!" He pointed his gun at the switch—

Annwn yelled, "No!" and grabbed a piece of debris to throw at his hand—

Kwazar, deciding not to risk being hit, pushed the quick release on his safety harness in a vain attempt to stop her—

Miranda sat still, her black hair highlighting a confused face—

With an earthquake-like jolt, the vehicle floated through the air. Annwn didn't think a creature existed on Elara that could lift the vehicle so far with a single hit. The only possibility would be—she shuddered and grabbed the nearest seat, which happened to be Miranda's. Miranda gave her a panicked stare that seemed to say, "Why?"

Miranda's expression made her feel bad, but she couldn't comfort her, not now anyway.

A jarring impact coursed through the vehicle. Annwn felt herself being

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pressed forcefully into the floor. A wash of water chilled her legs, and slithered across her cheek.

"Oh, no!" she said. They had landed in a lake or something, and the ATV's seals had been broken by the Elaran creature! Sinking fast! She tried to stand up, but the water forced her down, surging above her bony knees. Wildwind furiously banged on the door with his strong fists. He must have dropped the gun during the fall.

The scene froze, and dissolved.

Annwn's vision focused on the multitude of monitors embedded in the learning console before her. She wanted desperately to leave. She had been in charge, and therefore most of the ruckus had been her responsibility.

"I see," said Teacher, with an irritated voice that seemed to emanate from nowhere in particular, "that you haven't learned much since the last sim."

Annwn nodded solemnly, regretting her actions. *But I couldn't help it,* she wanted to cry out loud. *That stupid Wildwind was to blame!* She held silent, for she knew Teacher would not be tolerant of "outbursts." Artificial intelligences were good at being firm.

"You all failed."

"Failed?" cried Wildwind from his spot behind her.

"Yes, due to an inability to settle petty differences, the entire mission ended—how should I put it?— rather abruptly. No single action that I witnessed suggested that any of you are ready for the task of living on an alien world."

"Yeah," replied Wildwind, "but Bode's not Elara. Bode's real!"

"Quiet!" Teacher paused. "Elara has been used effectively by generations of colonists. Elara is probably the most detailed life-bearing planet training module ever created. Nothing else has worked as well. And whether or not Elara is real is beside the point. You can still learn from the sim, and none of you seem to be doing so."

Annwn felt bad at those words. She always liked to think of herself as a reasonably intelligent girl, and to have Teacher suggest otherwise shook her confidence.

"What really disappoints me is that your demonstrated learning abilities show me that you are capable of pulling things together. Think about what happened today and ask yourselves what went wrong. What can you change to handle the situation more effectively next time? I'm not here to be your guide forever—you need to learn how to cooperate with each other on your own. This is not a suggestion. It's a task. We will discuss what you've discovered tomorrow."

Annwn sighed.

"Now, before you go, you should also be aware of some homework I've assigned, a few extra lessons on Bode. We're getting close to our destination, and considering your behavior during the Elara sim, you will have to catch up somehow. The relevant tutorials will be on your terminals at home."

When, Annwn thought, *will the workload end?* She quickly looked around. The others, especially Wildwind, appeared no happier than she.

Everyone waited in silence for a few moments.

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"That's it. You can go."

"Yes!" exclaimed Wildwind as he jumped from his terminal and rushed from the room.

Annwn, quietly thinking about her assignments, left after Wildwind.

"I'm caught up on my homework," said Annwn with both pride and relief. Fortunately the "think about your actions" lesson was easy, only consuming a couple of minutes.

"Ah, good," said her father, still looking unhappy. He had been in a bad mood ever since Teacher told him about her fight in class. Annwn recalled that Teacher's tendency to report all events to her student's parents produced a number of nicknames among the boys, including, but certainly not limited to, "Tattler" and "Traitor."

She took a bite out of the processed something that resembled a dinner of poultry. She usually called it "wax slab o' protein," referring to the time, when very young, she decided a candle was candy. The moderate chickeny flavor the dinner had kept her chewing, but left her sorely missing the fresh food of California. Starship life was a bore! Fortunately, all the things she despised about starflight would change when they reached Bode.

"And what did we learn today?" her father asked, between bites of his own sterile meal.

"Well, not as much as you've already told me. You know, Bode lessons."

"So you're covering the plants?" he asked, reflecting his deep interest in botany, a part of her father that she enjoyed.

"Yes. Two whole lessons."

Her mother looked worried. "Aren't they poisonous?"

"Sure are," replied Annwn. "That was the main topic today. We can't eat any, save for a few, and those exceptions are only edible if they are prepared correctly."

"Keep that in mind when we get there."

Annwn nodded, taking small bites from her food.

Looking hopeful, she asked, "Mom, since I'm done with my homework, is it OK if I go to the shuttle with my friends?"

Her mother looked agreeable, but her father spoke up before she said anything. "There's the matter of what happened in class today, Amber."

Annwn hated it when her father used her given name. Certainly her own choice was much more imaginative. Knowing she was not on the best terms with her parents, she said nothing about it. "I know. I overreacted. But Wildwind can get intolerable."

"Yes, Dell gets a little carried away," her father said. "But that does not excuse you."

"It won't happen again," she said with determination, not all of which was mock. Failing to accomplish much during the Elara sims seemed a little ridiculous to her. But her friends' happy-go-lucky approach to assigned tasks was frightfully contagious.

Her father rubbed his chin, "Haven't I heard that before?"

Annwn looked guilty, lowering her eyes to the half-eaten meal in front of her. "I promise," she said gently. "I'll do my best."

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"You'll do more than your best. You'll behave." Her father paused, apparently thinking on the topic a little more. "You can go. However, such behavior had better not happen again, or your shuttle visits will end."

"Thanks!" She smiled.

"Yes, well, I might suggest you discuss with your friends how you guys can work together."

Thinking about all the upcoming fun, Annwn barely heard her father's comment. She stood up to leave.

"Those shuttle visits are becoming quite regular, aren't they?" her mother asked as she took her first step from the table. "You're sure it's OK?"

Turning around, Annwn said, "Yes, Mom. We asked the engineer. He said as long as we kept the shuttle doors open and stayed out of the bridge, we could use the shuttle for our SCA stuff. We're always careful."

"Those shuttles are powerful machines, and I don't want you getting hurt."

"We won't get hurt."

She gave Annwn her serious "I'm concerned about your welfare" look. "Just be careful."

"No problem." Annwn turned and walked briskly from the table, happy to be heading away to her hideout, the shuttle. She always felt free away from her parents.

"And don't be late for sleep," called her mother.

"Yes, Milady. Please stand aside as I defend your honor against the evil and most sinister of black knights." Annwn smiled and stepped back, sitting in one of the few acceleration chairs available in the shuttle's small secondary cargo bay. Daytime crew were fitting the primary bay for their descent to Bode, their efforts hidden behind securely locked doors, so Annwn and her companions could no longer play inside the larger space.

Kwazar turned around and moved toward Wildwind, who was dressed rather menacingly as the Black Knight. Kwazar's makeshift armor squeaked and clanked with his strides. He held his bamboo sword ready—the Society for Creative Anachronism might frown on such weapons material, but they hadn't been able to find rattan locally.

Miranda stood between them, looking small and frail by comparison. She held a staff ready, keeping the knights in check by holding the long pole between them. As Marshall, she made sure the warriors fought honorably.

"Come, Black Knight," chided "Sir" Kwazar, "fight, or run away like some mere pansy!"

"Pansy, you called me!" echoed Wildwind's deep voice from the black can that served as his "helmet." He had somehow managed to sneak into the machine shop and weld small horns on each side. "No one calls the Black Knight a pansy and gets away alive!" Wildwind readied his sword and stepped forward. "None shall pass," he said, carrying on a sickly cliché tradition that had persisted since nearly the beginning of the SCA in the twentieth century.

Annwn preferred these times to all others with her friends. Wildwind was actually tolerable during their playacting, and at actual SCA events, as

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if he somehow left a piece of himself behind. Though she wasn't all that sure about her assessment, since only one actual SCA event had been held on ship, right at the beginning of their trip, just before sleep. Maybe the cryogenics changed him . . . but probably not, for he still acted decent during their play events. Kwazar, always being nice—sometimes too nice—contrasted sharply with Wildwind, and the friendship between the two boys amazed her. Despite his niceness, Kwazar made a great knight. While the boys thought in terms of armor, she and Miranda liked to dress period-style, putting on vast layers of garb, draping their bodies in heavy cloaks. Currently she wore her favorite azure knee-length tunic, with a trim of glittering argent, dark gray trousers, her heaviest gray cloak, and a sable belt around her waist, with the long tip hanging to her lightly shod feet.

"Begin!" said Miranda, pulling up her staff and stepping away from the armor-clad warriors.

Circling each other, the two knights readied their shields.

"I'm waiting, pansy," taunted Kwazar.

"I'll impale your helmet into the wall." Wildwind laughed a sinister chuckle, "Bwa-ha-ha-ha!"

Opportunity at hand, Kwazar swung his bamboo weapon in an arc toward Wildwind's head. Wildwind quickly blocked the blow with his aluminum shield and swung for Kwazar's thigh, only to have his attack also blocked with a shield. Kwazar recovered his sword and swung fast, smashing the bamboo against Wildwind's shield, fracturing the precious weapon.

Both knights fell, toppling Miranda. Surprised by the knights' collapse, she gasped.

Annwn's chair shuddered, much too strongly to have been from their fall. "What's happening?" she demanded. Only a nearby shuttle launch would have produced such shaking—and none of the local shuttles were fully prepared for descent.

The voice of Teacher filled the room, "There's an emergency. Strap in. You're going for a flight."

Confused, Miranda and the two knights slowly made their way to vacant chairs.

"What's happening?" Annwn asked again as she buckled herself into the seat.

"Barnard's Star has produced an unusually strong flare, threatening *Atlantica*. Fortunately we're close to Bode."

Close? she thought. *That's right, Teacher said—*

Miranda, surprised by Teacher's words, said, "But Barnard's Star is not a flare star!"

"Yes, astronomers have not detected any strong flare activity on Barnard's Star. Until now."

"But isn't the *Atlantica* shielded?"

"The magnetic shielding for interstellar flight was shut down to allow passage for a number of emissary shuttles launched some hours ago. Restarting the field in time to protect the crew from the large dose of incoming radiation is not possible, as parts of it have been dismantled for maintenance. You are better off on

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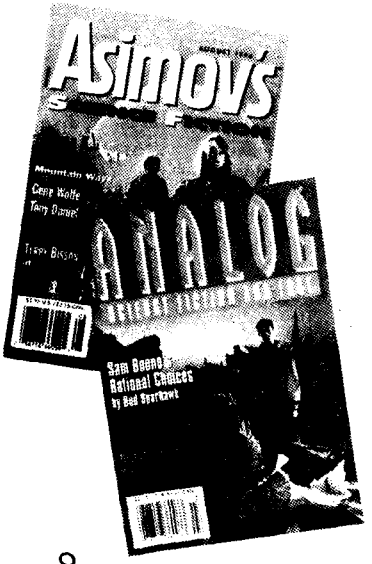

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the surface of Bode, where there's a strong planetary magnetic field and a deep atmosphere to protect you."

The shuttle access door closed with the thunk of magna-locks.

Cut off from her parents, Annwn felt a surge of fear. "No!" she cried, "What about Mom and Dad? What's happening with them?"

The shuttle engines fired full, producing a body-shuddering roar. Through the open bridge door, she could see out a hemispherical window up front. Silently, the outer bay doors split apart, unveiling a widening tapestry of bright stars. Her jaw dropped. They *were* going for a ride, and it was for real, not a sim.

High gravity pressed Annwn firmly into her chair as the craft erupted from the bay and into the black void. Harnesses pulled forcefully down on her chest, restricting her nervous breathing, and she grew dizzy as the acceleration pinned every extremity into place. Bright, blinding flashes seared through the windows, causing the panes to temporarily darken. A loud clang followed, and the shuttle cartwheeled, making Annwn's stomach turn. The interior lights blacked out. Brightly lit consoles flickered. The drives continued firing, and she saw a sharp crescent swing into view, blue-white and glowing, almost friendly.

Annwn stared out the window, watching the world below. Bode's curved edge expanded rapidly, showing spiraling storms hugging a deep blue ocean. Quickly outgrowing the window frame, the planet's rim became lost and she could only see clouds, flickering with lightning where the foam-like bands streaked across the terminator.

Out of the corner of her eyes she saw her friends, all, like her, sitting stiffly in their seats. She felt a little sorry for the two in the heavy armor—wearing those bulky metal plates got painful after awhile.

The windows darkened, and the vehicle shuddered. A vast force pushed her into the chair, one that steadily increased until she could bear her own weight no longer. . . .

"Shit," Wildwind said, "we're really in a fix now."

"Hush," replied Miranda, "cursing will get us nowhere." She added fearfully, "What are we going to do?"

"Wait here, I guess," he replied. "What else is there to do?"

"I . . . I don't know. I don't like being stuck here." Miranda sounded worried.

"Well, neither do I! But we're here, so we may as well get used to it. Until the rescue arrives, that is."

"I hope they get here soon."

"Look," said Kwazar, gazing in Annwn's direction, "Annwn is awake. We can ask her opinion of our situation now."

Everyone carefully walked over to her, crossing a tilted and buckled floor. Wildwind stayed in the rear.

Annwn rubbed her eyes, remembering, with a start, the events that led to her being strapped into one of the shuttle's chairs. "What's the story?" she asked, tiredly.

"Crash landed," added Kwazar.

"What?!" His answer finished the

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waking process.

"Yep," said Wildwind, "the shuttle is as dead as any dinosaur. The beacon to signal our location even seems to have bought the big one."

"Where do you get those phrases?" replied Kwazar, smiling a little.

Wildwind grinned and winked, but said nothing.

Miranda seemed frightened by Wildwind's harsh appraisal of the situation. Annwn said, "Look, Wildwind, this is serious."

He glared at her. "So?"

She sighed. "We need to prepare for this situation, not frighten people!"

"Hey, I'm just facing facts!"

"Face them in a nicer manner!"

Wildwind, about to retort, was cut off by Kwazar's prudent interjection, "So we're lost, right?"

Annwn paused. Wildwind looked away, arms crossed.

"Yes, thanks Kwazar." Fears welled up. *What happened to* Atlantica? *Where are her folks? Could they be . . . ?* No, she didn't want to think about that. Not ever.

Apparently having thoughts similar to hers, her three companions remained quiet. She looked around, noticing that the boys had taken off their armor and were now wearing their backup gray tunics, capes and sweats. Behind the standing figures, she could see that the shuttle's bay door had broken open, letting sunlight stream into the dark interior.

She didn't like the fears lingering in her mind. Releasing her straps, she stood up and swayed as blood rushed from her head. Her neck hurt, probably from being held at an angle so long while she—what? Slept? Fainted?

Miranda said quietly, "Our situation doesn't seem very good, does it?" For the first time Annwn saw Miranda on the verge of crying. But, then, the problem they now faced was different. Real. Not Elara sims.

Annwn, unwilling to lie to Miranda, said, "No, it's not good. I think we only have one choice in the matter." She grabbed Miranda's hand to help assure her. "But it does not mean things will remain bad."

"What's that choice?" asked Wildwind, in acid tones suggesting he had anticipated her answer.

Here we go again, thought Annwn. *Out of the SCA and back to his old self. Why?*

She looked into Wildwind's eye. "We're going to have to hike to the colony."

"Wait a minute, there," he replied, "Tattler even told us that if we ever became lost, we should stay put."

"Her name is 'Teacher'!"

Glaring at her, he said, "I say it's 'Tattler.'"

She glared back. Not wanting to constantly argue over trivialities, she said, "Anyway, I agree with your assessment."

Wildwind smiled. "Well, good."

Enjoying her trick, she finally added, "Except, *ex-cept*," she emphasized the two syllables, savoring Wildwind's worsening frown, "in our current situation. It's different."

Irritated, Wildwind asked, "How so?"

"Because we are on an alien planet where there are only a few people living in a single, small colony. They

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won't have many search parties. We're on our own."

"They have satellites," he retorted.

"Good point, but not good enough," replied Miranda, who seemed to be getting over her initial worry. "First, satellites are few. This isn't Earth. Second, that flare could have fried everything in orbit, meaning all satellites."

"Also, it seems to me," said Annwn, gaining momentum from Miranda's support, "that, if there are many pods on Bode, it only compounds our situation. The search parties are going to find the survivors with working beacons first. We'll be last, and that's if anyone knows that our shuttle launched."

"OK," said Wildwind, "maybe we're the only ones who fell. What then?"

"I doubt it," retorted Kwazar. "We'd like to think the *Atlantica*'s OK, but those bright flashes we saw say otherwise. I bet the ship's gone, and—"

"Enough!" interjected Annwn. She didn't want to hear the words. "We're walking. Period." The urgency in her voice surprised her. Something about Bode disturbed her, but she couldn't remember what.

"OK!" retorted Wildwind yet again, angry that everyone was teaming against him. "Walking where? Where are we?"

His point stopped Annwn cold.

Wildwind smiled in satisfaction.

Miranda broke the silence. "I can answer that." She considered Wildwind's questions, holding her hand to her chin. "Maybe."

Exasperated, Wildwind turned to her with his jaw agape. "How?"

Miranda glanced outside, staring at sunlight gaining a hint of orange, and at a range of mountains that added a wavy ochre line along the horizon. "It's nearing evening. I'll show you when it's dark."

"Yeah, right," said Wildwind sarcastically.

"Just you wait and see." Miranda turned her back to him and gazed out the open door.

Annwn quickly recovered her lost momentum. "Waiting until evening gives us time to check our supplies. What kind of food do we have? And how can we move it?"

"We haven't looked yet," replied Kwazar.

"Well, now we have something to do. Where's the emergency food located at? In the bridge?"

"I can answer that," answered Miranda, smug in her knowledge of spaceships.

"Somehow, I'm not surprised," said Wildwind dryly.

"Well, tell us then," said Annwn.

"OK. There is some in the bridge, and some under the floor hatch over there, and . . ."

Annwn, happy to see Miranda's mood improved since she had just awakened, smiled despite her own fear about their predicament. It seemed as if getting Miranda's mind on survival helped her cope with her worries about the situation. Did Teacher suggest this once?

"There we go. Orion!" Smiling gleefully, Miranda pointed at the constellation glittering in the cold, black sky.

Annwn looked up along with the

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others. She found the sight confusing. The group of suns looked like Orion, but a very bright star added another dot to the belt, making a kink in the otherwise straight line.

Miranda laughed. "You all look confused. That extra star is the Sun! That's where we are from!"

"Our Sun's that bright?" asked Annwn.

"Yes. Sol isn't average, Sol's above average—the fourth brightest star in a radius of about fifteen light-years. Look at her shine!"

Annwn stared, silenced by the wonder. How strange to think of all the billions of people orbiting that mere point of light. The colonies on the Moon, Mars, and Callisto, filled with people, so familiar to her—she clearly remembered seeing the jewel-like glow of cities on the Moon from her home in California—were hidden from sight. Even the huge, audaciously bright nexuses on the Earth were lost, shrouded by vast distance. She couldn't see a single hint that anything of significance existed around the white dot that passed for her home Sun. She simply gazed upon a tiny fleck, silent, barely twinkling, one of thousands in the sky. Six light-years away and looking at home. So far. So alone.

"And just think," said Miranda, "anybody looking in this direction couldn't see the star we orbit, Barnard's, not with the naked eye anyway. Much too dim."

Her statement had a disturbing significance to Annwn. An old phrase, "Out of sight, out of mind" came to her, and she shivered. The thought left her feeling deeply lost, insignificant. Would they ever get rescued?

"OK," said Wildwind, "this astronomy stuff is all neat, but how's it going to help us? You brought us out here for a purpose, right?"

"Yes," said Miranda, "I did. You are looking at it."

"Orion?" Wildwind sounded skeptical.

"Um-hm. I asked Teacher to show me how to calculate where the Sun would reside in the sky. I also learned that Orion is a constellation that can only be seen in the northern hemisphere of Bode."

"Ah," replied Kwazar, "so we know what hemisphere we're in."

Miranda nodded excitedly.

"Which places us quite accurately," he continued, "for only one large landmass occupies the north half of Bode."

"And," added Annwn, uplifted by the latest news, "the colony is on that large peninsula of land, on the west coast, beyond the mountains." She pointed in the direction Barnard had set, her feeling of isolation diminishing.

"Yes," Miranda said. "Our situation is not as bad as it seems."

"Yeah," replied Wildwind, "but I bet it's a long walk."

Miranda looked at him, frowning. "True. The coastal range over there is at least one hundred kilometers to cross—and that doesn't count traversing the plain we're on."

"That's weeks, maybe a month! Can we even do it?"

"Look at it this way," Annwn said, "you can stay here, being cooked alive daily by the sun, bored, and alone, *or,"*

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she slowly emphasized the word, "go on a hike to the mountains, and eventually reach the colony, with us."

Wildwind glanced at Kwazar and Miranda. The two nodded. "We need to stay together," Kwazar said. Miranda looked expectant.

Wildwind gave Annwn's words more thought, the strain showing clearly on his face. He finally said, "OK . . . OK, I'm convinced. I'm going."

"Great!" replied Annwn, "then I guess we get moving in the morning. We don't have enough food to dawdle." She felt good at convincing Wildwind to stay with them, seeing it as a small victory. Maybe things would go right for a change.

After some sleep, maybe even the standard eight to twelve hours, Bode's disconcertingly long night irritated Annwn. Along with everyone else on *Atlantica,* she had been adjusting her sleep cycles to Bode, a process that she had difficulty with even at the beginning. Now trying to deal with the real thing, getting used to twenty-two-hour nights seemed an unreachable goal.

Sleeping next to her, Miranda moved about restlessly, occasionally mumbling items from dreams. Annwn wished she could help her friend's worries more, yet didn't know what to do. She sighed.

She wondered whether they should be hiking right now, instead of resting—their time, she felt, was short. However, the others had acclimated to Bode's days much better than she, and Annwn did not see any wisdom in having anyone else overly tired on account of her. Rest might slow them down initially, but would help when things became difficult, like during their future mountain climb.

Were they even ready for the journey? She mentally checked over their supplies. They had enough food to last roughly two Earth weeks, equal to about seven days on Bode, if they were somewhat sparing. Water was less portable: they couldn't haul two weeks worth, certainly. Fortunately, they had found some filtration devices which they could use on local streams. Since they'd be heading into the mountains, she was sure they'd find some water. They just needed to survive the long trek across the volcanic plain where, unfortunately, the shuttle had crashed.

They had also found a large wheeled cart. By laying the cart back on its four trucks, and tying some nylon leads to the handle, they converted the device into a wheeled "sled." The many supplies they required, including two tents, a chemical heater, first aid kits, and their four sleeping bags, couldn't be moved without the sturdy, roomy cart.

Hauling the sled across the rough plain would be an arduous task. Everyone would have to take turns pulling, two by two.

She stared out the open door, looking at the stars. Orion glowed vividly, showing Sol with uncaring, seemingly taunting, abandon.

What secrets did this unfamiliar world, Bode, contain? What sinister fact kept eluding her consciousness, something she had known once, but could no longer remember? She wished the sims had not been about

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Elara, but of Bode. Such wasn't the case, as Teacher had often said to her frequent questions, for Bode was little known—certainly enough of an unknown to be unusable for good survival practice. Basically, Elara had many more tricks.

Growing tired, she drifted off, her uncertainties mocking her, forgotten ideas flirting with her consciousness, insisting she stay awake. . . .

Digging through the small scattering of debris left on the bent shuttle floor, she noticed that the large storage bay door had cracked open during the crash landing. A whimpering sound emanated from the narrow opening. She looked inside. After her eyes adjusted to the darkness, she saw luxurious animal pens. "So that's what they were doing," she whispered to herself. The crew had been preparing the shuttle as a transport for the few pets that had been taken on the interstellar voyage. Most species useful to humans had their genomes frozen for future cloning, she knew, an efficient method of transport. Yet some people couldn't part with the animals they owned, and had their companions brought along.

The paddocks contained a collection of limp forms which she realized were the dead bodies of canines. Refusing to see the horror, she turned from the corpses, thanking the gods silently for the dark room, and for her own survival in a crash that obviously could have been lethal. She saw the puppy as she looked away, just as the tiny fuzzface saw her. With a sustained series of whines, the little blue-eyed mammal waddled over to her and dropped on her feet. His furry gray body quickly warmed her toes.

Considering the terrible shock the pup must have sustained from the death of his comrades, her heart opened to him. "Oh, you poor puppy!" She reached down and picked him up. He whined in delight, and when she held him up to her face, he warmed her cheek with a tiny, red tongue. She held him tight, enjoying his warmth and softness.

"Hey," Wildwind irritatedly called, "what's taking you so long in there? We don't, as *you* said, have enough food to last forever!"

The puppy cringed from the loud voice, pulling back his fuzzy pointed ears and letting out a little questioning whine.

"OK! OK!" Annwn gratefully stepped away from the lifeless forms lying inside the dark pens. Not wanting Wildwind to order her around, she chose a slow walk. Trampling cautiously across the debris-covered bay, she stepped out into the warm midmorning sun.

At the sight of the puppy, Wildwind asked, "What's that?"

"Xavier," explained Annwn.

He looked angry. "We can't take him. We don't have the food."

Shocked at his words, Annwn said, "We can too! And I am going to take him, no matter what." Xavier gently licked her hands.

"How are we going to feed him? We've barely enough for ourselves."

"How can you leave him?" She held out the loving puppy for everyone to see. "Would you want to be responsi-

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ble for his death? A slow, torturous one by starvation?"

Both Kwazar and Miranda smiled at the little canine, but refrained from saying anything. Annwn understood that they did not want to add to a potentially volatile situation, but was disappointed by their neutrality.

Wildwind, unconvinced, said, "I don't want to die because of some stupid puppy. He's not getting any of my food."

Annwn grew angry at him. "I'll give him part of my share, OK? Is that good enough for you?"

"Fine then." Wildwind turned away, grabbing the lead of the makeshift sled. "It's your damn stomach."

"Sure are many different plants," commented Kwazar as they trudged along the broken rock, slowly dragging the cart over the rough terrain.

Annwn recognized his sarcasm. "Right. One. The same old agave-like weed that appears to prefer cracks in the rock." Her shoulder hurt. She adjusted the rope that connected her to the cart.

Kwazar smiled. "You think there'd be a few more."

"Maybe most of the plants only grow in the spring." For some reason, her words were bothersome, but she let the feeling go.

Miranda ran ahead of them, watching the large, very bright disk of Bode's sun. "Here we go!"

The entire landscape darkened, as if a shadow of some great thing passed over them. The sky shifted from indigo to black, and stars glowed brightly. She looked up and saw that a very great thing really was casting a shadow on them: Bode's huge moon, Brahe, a world she had completely forgotten about until this moment.

"Isn't it great!" Miranda jumped up and down in excitement at the sight. "No eclipse on Earth would compare. Look at how dark it's getting!"

The temperature dropped noticeably. A deep silence ensued, as if the shadow had blanketed the landscape. Even the wind died.

"How long do the eclipses last?"

"Oh," replied Miranda, "fifty-ish minutes. Depends on where you are. And just think, it happens on a daily basis, maybe even where we are, but I'm not sure about that. Autumn is a time that I'd expect the eclipses to happen over most of the planet, I think, so I wouldn't know until winter solstice."

"You won't have a long wait," replied Annwn in downhearted tones, afraid of what winter would bring. Yet for some reason, winter, with its prospects of cold rain, freezing wind, and long nights was not her biggest worry. Something else even more sinister lurked on Bode. But what? She wished she could remember.

"Of course, since our world is tidally locked to that huge moon, only certain parts of Bode even have such eclipses."

"How do you know so damn much?" asked Wildwind, still engrossed with the suddenly dark sky.

"I just read a lot, I guess."

"Hmph."

Annwn stared at her trudging feet, preparing herself for another night. Last night's camp, with Bode's unend-

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ing night, had been torture. And she was tired and grumpy all day long, her painfully sunburned face and arms not helping the mood. She really despised having to go to the bathroom in such open, sharp terrain. Fortunately Miranda helped by holding up her increasingly battered cloak as a barrier against curious eyes.

Evening approached, slowly, methodically, with the giant disk of Barnard's Star dropping behind the destination mountains, a process that took almost a quarter-hour. Brahe's ruddy half disk shone brightly above, marked by vast craters, twisted, snow-capped ranges, fleecy clouds and frost-filled valleys, dwarfing even her most grandiose memories of a full Moon rising over the Berkeley Hills.

"Sunsets last forever here," observed Kwazar.

"Well," said Wildwind, "we should take advantage of that and set up camp soon. Or we'll freeze."

Annwn shivered, holding Xavier tightly in her thin arms. For once, she could not argue with Wildwind. "Yes."

Wildwind looked around, seeking a decent spot to put up their small tents. He stumbled over some loose rocks and fell to his knees. "Ouch!"

Annwn couldn't help laughing.

Miranda walked over to him, "You need some help?" She offered a hand.

Quietly, he said, "No."

"What?" The wind fluttered Miranda's unkempt hair.

Ignoring her question, Wildwind held a palm to the rock. "The ground is vibrating. And the shaking seems to be getting stronger."

Xavier shivered and forced his nose deeply into her underarm. Annwn grew deeply concerned.

"Look at the plants!" Kwazar pointed to a nearby cluster of succulent vegetation. Thick, spearlike leaves gently bounced up and down, dancing to a tune unrelated to the slight breeze.

Frightened, Annwn stepped back. "What's causing it?"

"Earthquake," Kwazar replied.

"No," said Miranda, her voice wavering, "not an earthquake."

As a unit everyone looked in the direction she stared, to the north, where the indigo sky graded into a blue-black and interfaced with the rough plain in a disturbingly jagged line. Annwn realized that many of the jags were moving. *Animals!* The vast herd galloped directly toward them at a disturbingly fast pace.

"Shit!" said Wildwind, eyes opening wide.

Annwn backed toward the south. "We—we've got to find a shelter!" She turned around and ran, kicking hard with her long, clumsy legs.

"Run!" Kwazar yelled from behind.

After stumbling on some rocks, Annwn heard Miranda sprinting behind her. "Wait up!" she cried desperately. "I can't run fast!"

Annwn slowed, shifting Xavier into one arm and holding him like an ancient football. Grabbing Miranda's arm, she pulled her bounding form along. "Thanks!" said Miranda, reassured by Annwn's caring gesture.

Broken, rugged ground made for slow going or twisted ankles. Plants became a slick hazard when crushed underfoot. The ground's tremors increased violently, adding to the confusion.

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"We haven't a chance!" yelled Wildwind over the racket made by the cart he pulled. "They're moving way too fast!"

Annwn looked behind her, and the sight sent her heart racing ever faster. What had once been distant, tiny silhouettes were now huge eight-legged creatures blowing vast puffs of steam through long noses which jutted from broad, flanged heads. Their bus-length torsos, being extremely flat and tall vertically, were shaped like fish, and undulated over the ragged landscape with comical ease.

Intercontinental highway, she thought. Only on the gigantic roads had she witnessed such terrifying speeds. Not even a diving falcon could outrun the huge freight trucks that traversed the largest highway ever created.

She ran faster.

Miranda complained at the increase in speed and stumbled, losing her grip. "Ouch!" she called as she tumbled across the rough basalt.

Annwn, fighting against her terror, stopped to help. Before she could offer aid, Miranda quickly jumped to her feet. Fear, Annwn realized, was a great motivator.

Miranda waved Annwn on. "I can't run as fast as you. I'll try to keep up on my own."

Annwn grabbed her arm anyway. "You have," she said between pants, "to run your fastest." Breath. "There isn't," gasp, "any other choice." She dashed away, Miranda in tow.

A sunken portion of ground confronted them. Kwazar said between hard breaths, "Collapsed lava tube."

Annwn remembered a camping trip she had taken to the Snake River Plain of Idaho. "Caves!"

Kwazar knew what she was referring to. "Yes. But this one is collapsed."

The crumpled tube had steep sides. Turning to Miranda, she said, "Stay here. Hide behind . . . one of these ledges." She pointed to a particularly large column of basalt.

Before Miranda could respond, Annwn ran into the broken cave. She could hear Kwazar following close behind. He must have realized as well.

"You think a cavern will be close enough?"

His ability to run and talk amazed her. "I," gasp, "hope!"

Filling the very air as if it had physical form, a throbbing, bass rumbling churned in her ears, pulsed through her body, and echoed from the tube's rocky walls.

"Wait!" came Miranda's muted voice. "The sled's stuck!"

Not the sled! Annwn thought. Visions of their rations being trodden flashed through her mind as she turned around. She saw both Miranda and Wildwind yanking on the craft, trying to pull it over the tube's lip. A trapped wheel prevented the cart from budging.

"Lift! Don't pull!" she forced out as she climbed the tube's rocky side, scraping free arm and knees. *"Lift!"* The very act of speaking made her dizzy.

Looking angry, Wildwind finally listened and pulled up on the sled to dislodge the wheel.

A shadow rushed past. Slapped by the creature's blast of displaced air, she fell onto the sled, destroying any

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progress that Wildwind had made in getting the platform free. Xavier spilled from her arm, tumbling among the food items carried in the cart.

"Out!" Wildwind violently shoved her off the sled. She rolled onto the angular basalt, painfully banging her head.

With a huge grunt, Wildwind yanked the sled free and tossed it down the small ravine. Annwn heard the carriage crash and shudder as the metal frame careened over boulders. She tried to look, but the pain in her head prevented her from moving. As the sled stopped bouncing, she heard a yelp.

Blurred colors filled her vision, a series of brilliant horizontal streaks. She forced her eyes to focus, and the pastels materialized into rushing animals. The creatures were beautifully patterned in brick red, ochre, and white. Mesmerized by the scene, her immediate concerns drifted away. What splendor! If only her parents were there to witness the animals with her.

"Get her down, Miranda!" She heard Kwazar's voice, somewhat distant.

She felt a tug at her leg. "I can't. She's too heavy for me!"

"Her?" said Wildwind. "Toothpick Annwn?"

"Shut up, Wildwind!" retorted Kwazar. "You've done enough already!" His words were barely audible over the rushing animals.

Shadows passed overhead, the orange sunlight flittering off and on as if Barnard's Star had become a strobe. Sharp gusts of wind buffeted her face and body. Someone dragged her across the rock by an arm, and she broke from her pain-induced reverie. The beasts leaped over the imploded tube with the ease of vast momentum as Kwazar carried her down to safety.

She saw Xavier cowering under the scratched sled, favoring a foot. She would never forgive Wildwind. He was too mean.

Fearing the approach of another herd, they made camp in the collapsed tube. A chemical heater sat between their two tents. Annwn, with Xavier playing close by, sat as far from Wildwind as possible while still keeping close enough to the heater's warmth to be comfortable.

The powerful rush of wind the running creatures had made bothered her.

Making a point of looking away from Wildwind, she forced herself to speak. "Why would an animal need to run so fast?"

There was a moment's pause. "Predators," replied Kwazar.

"Yeah, but Earth has predators, and no ground animal can run nearly as fast as the beasts we saw today."

"This planet's different. Maybe the predators are fast too. Hell, we're not even sure what we saw weren't predators."

"No," she replied, remembering her dad's frequent talks on biology and evolution, "with that many beasts I think they were plant eaters."

"OK. They ate plants. The predators could still be as fast."

"Yes," she had to agree, "it seems sensible."

"I hate to disagree," said Wildwind with an insincere grin and a smug look that he always got when he

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knew something that others didn't, "but I didn't see any predators chasing the herd."

Annwn refused to look at Wildwind, holding silent.

"How do you know?" asked Kwazar.

"I looked. Carefully."

"Weren't you afraid like the rest of us?"

"Oh, I was afraid all right. But not of those overgrown eight-legged elephants. I've been among herds before, back in the Elara demo. Large hallucihexadons. Don't you remember?"

Kwazar nodded, grinning at the reminder of yet another Elara sim that all persons present helped progress from bad to worse in rapid order. "Then what *were* you afraid of?"

"The predators I assumed were there. On Elara, it seemed as if the hallucihexadons were always running from some kind of predator or another."

Kwazar frowned at the thought. "So what's your point?"

Wildwind smiled. "The overlegged cows moved with purpose. Something got them running, and, like I said, it wasn't predators."

Disturbed by his observation, Annwn quietly shivered and contemplated what he had observed. What motivated the herd to move so fast if not predators? And why did such movement bother her so? For some reason she kept remembering all the times she and her father had talked about Bode's plants. But what did vegetation have to do with the herd?

Plant eaters ate plants, of course. *Yes,* she thought, *that was part of it.* Bode's disconcertingly speedy seasons were another part. Excited by her discovery, she spoke up, "Maybe the beasts were migrating!"

She had the group's attention. Wildwind, no longer the center of interest, scowled. Annwn smiled inwardly at his disappointment.

Kwazar asked, "What do you mean?"

"Think of the fast seasons, and the rapid changes in the plants. You'd have to move quite fast to keep up."

"True," said Kwazar, "but animals can hibernate, or just skip eating for a few weeks."

Annwn couldn't help a smile. She recalled her dad's serious discussions of evolution, and said, "Your ideas are good, but evolution is not deterministic. Evolution can only work with what is available to it at any given time, not what may be available. The most sensible solutions may be unreachable, for required features may not exist to allow them. In this way, evolution can be counterintuitive."

"What do you mean?"

"The beasts we witnessed may not have had the necessary features to evolve hibernation, so evolutionarily they have pursued their most achievable and successful solution to eating Bode's plants. Migration may have been the only method they could evolve." Proud of her deduction, she felt much better than she had in a long time.

"Herbivores chasing plants," Wildwind commented dryly. "Kind of hard to believe."

Annwn glared at him. "Believe what you must."

* * *

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Annwn stood up and walked over to the cart, rubbing her arms to ward off the cool night air. She opened up a large "satchel," made from blankets, and pulled out a medium-sized backpack covered in pockets. "I wish we'd brought more," she commented.

"What're you doing, anyway?" snidely asked Wildwind. "Whatever you take out, you're putting back.".

Exasperated, she turned around and held the pack at her feet, giving him an angry gaze. "Listen, Wildwind, we almost lost the cart this evening, and—"

"And what? You're taking all your things off the cart? You don't trust us?"

"Cool it, Wildwind," said Kwazar. "I think she has a good idea."

"Hey, I'm just trying to find out what she's doing."

"Not in a nice way," Kwazar said. "And considering what you did to her, I think you should just shut up!"

"Make me!" Wildwind quieted though, and sat back in a huff.

Looking afraid, Miranda covered her ears against the raised voices.

"For your information," said Annwn stiffly, glancing angrily at Wildwind, "I was going to put food in here for all of us, not just me. We shouldn't have all our supplies in one location!"

Wildwind chuckled.

"A backup just in case the cart is lost, fool." Kwazar gave Wildwind a hard stare.

"You don't need to lecture me!" He looked at Annwn. "Who's carrying the pack?"

Annwn sighed. "We trade off. It's only fair."

He nodded. "But how do we know whose food is what?"

"Don't you think your insistence on dividing the food is a bit selfish? Talk about not trusting people."

"As long as you have that mutt, we're keeping the food divided." He glared at the resting puppy.

"He's little. He hardly eats anything!"

"Still, that little bit can mean a lot in the end."

"Can't you let up just once?"

"Not in the case of food!"

"Fine, then, I'll pack all our rations in separate containers."

"Good."

"But," she added, "the backpack won't hold as much if that's the case."

"That's just OK with me. I'm not going to let the cart get lost, anyway."

"What about the others? Maybe they want more food in the pack." She looked her companions.

"Yeah," said Kwazar, "maybe we should just leave your food out!"

Wildwind thought about Kwazar's comment. "Now, I wouldn't go that far—"

"I see, so you *do* agree with Annwn's idea!" Kwazar smiled.

Wildwind realized that he had been defeated. "OK! You don't have to separate the food in the pack. But it stays divided in the cart, and we don't eat any from the pack until the cart's supply has run out."

"Or lost," replied Annwn.

"Duh."

"Sounds like a fair compromise to me," said Kwazar, stemming off another argument. "Are you OK with this?" He looked at Annwn.

She nodded, fuming inside. *Didn't*

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Wildwind care about anybody but himself? Regretting that she had asked Wildwind along, she angrily stuffed food into the bag.

Xavier stumbled upon the dead leviathan first. The beast had fallen into a depression in one of the last, most persistent, tongues of basalt before the plain gave away to steep, rounded foothills. Xavier yipped at his decaying discovery and ran to Annwn, tail tucked between his legs. Apparently he hadn't forgotten the herd encounter.

Adjusting the protective cloak to fit her shoulders snugly, she walked toward the corpse. More than once she was glad to be in SCA garb, for having a lot of spare cloth proved very useful. Today the dense fabric helped ward away the stench. "Ick!" She put the cloak in front of her nose.

Thickening high clouds covered what had been a sunny sky, muting the usual strong shadows of early afternoon. Yet the corpse stood out starkly from the landscape, resting among the broken rock and sparse vegetation. Huge, magnificent, powerful. Even in death, the beast seemed to be running, still seeking Bode's elusive plants.

"Wow," was all that Wildwind said. At least he didn't use profanity.

"Oh, my," said Miranda. "Look at those legs."

"Yes." Annwn had seen the limbs. Eight, just as she had counted on the beasts when they were running. Dense muscle covered long partially exposed bones, all of which were being eaten through by a horde of small insect-like critters. *Certainly not insects,* she realized, noticing their tiny fuzzy bodies and wings made of broad interlocking hairs, instead of the expected hard insect shells and clear, veined wing membranes of Earth bugs. Bringing her attention back to the beast, she understood that the massive legs bespoke the power required of them, as well as the body, which appeared to be a huge collection of feathery muscles, all attached to broad, strong ribs. Annwn, not fond of internal anatomy, walked away to escape from the smell, adjusting the straps of the backpack she wore.

Miranda followed her. "It certainly didn't die from some carnivore attack."

"No," she said grimly. "Starvation, most likely."

Miranda didn't add anything, quietly following alongside.

The boys were engrossed, trying to make sense of the alien critter. She turned and called out, "Come on! We shouldn't be wasting time!" She resumed her steady pace.

"OK, we'll catch up!" What could be so interesting about the corpse? She couldn't understand. And why didn't they seem very bothered by their predicament? Were they that good at hiding their fears?

Kwazar seemed to have forgiven Wildwind for his dreadful actions during the rushing herd, another thing she couldn't understand. She certainly hadn't forgiven him. Xavier healed quickly, but the bump on her head still ached occasionally, especially when touched.

Raindrops spattered down, a few cooling her sunburned skin. "Oh,

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no," she replied, "winter's arriving."

"Yep," said Miranda, "it's been about three days since our landing. That'd put us near the beginning of winter."

"So unimaginably fast." Annwn suddenly had a thought. "If the beasts respond so quickly, then the plants must as well, right?"

Miranda contemplated her question. "Well . . . yes. I'd say that sounds right."

"Then what do the plants mean for us?"

Miranda stopped walking, perplexed at Annwn's question. "What are you saying?"

Annwn heard Miranda's question, but did not respond, thinking about the meaning of her own query. The answer was right there, in her mind, but she couldn't pin it down.

After topping the first rise and wandering into a narrow valley surrounded by wooded slopes, the rain became heavier.

"Let's set up camp here, until the rain stops."

"Weren't you the one who said we can't delay?" came Wildwind's acerbic reply.

She frowned at him. "Things change."

"Well, make up your mind."

Infuriated, she ignored him and gave Kwazar a look that sent him into action. He began unpacking the tents.

Annwn grabbed a tent and had it set up in seconds. Self-assembling frames helped a lot. After his had expanded, Kwazar moved the shelters near a couple of windswept round-leafed "trees," which Annwn recognized as circuleaf trees. Her father had mentioned the plant, for it was abundant, and many people liked its pleasing features. Brightly colored orange and red, the shoulder-wide circular foliage apparently responded to autumn like Earth trees.

Kwazar picked a particularly large specimen of circuleaf and held it over his head, like an umbrella. Catching the rain with its thick membrane, the leaf kept him dry. He appeared happy with his ingenuity. "Ah, these things have a use."

A water drop found an opening and plunked onto his head.

"When they're not eaten full of holes, that is."

Wildwind, shaking his head at Kwazar's performance, proceeded to fasten the tents into the ground, using a small hammer and strong alloy stakes.

Annwn picked a leaf of her own. "I wonder why they are so big?"

"I might be able to answer that for you," responded Miranda.

"Oh, you might?" chided Kwazar. "And I suppose it has something to do with astronomy."

She nodded, carefully unpacking the sleeping bags that she and Annwn would be using. "Light."

"I remember that lesson," said Kwazar. "Bode only receives two-thirds the flux that the Earth does. Am I right?"

"Yep. The circuleaf trees are making bigger collectors, trying to get more light."

Annwn, not very sure in astronomy, was nevertheless bothered by the information. "Why hasn't Bode frozen?"

"Because of the low flux?"

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She gave Miranda a nod.

"Well, Teacher said that," she straightened her face and deepened her voice in an imitation of always serious Teacher, "'Due to vast tidal strains induced by Bode's close proximity to its parent sun, a large amount of internal heat is generated, which compensates for the lower flux.'"

Kwazar agreed with her answer, "I remember that topic, too."

"Ah, I see." She gave Miranda a "You're something else" look. "Geology, astronomy . . . I can't remember such stuff. I'll stick to biology."

"The tents are ready," said Wildwind dryly. "With no help from you lecturers."

Annwn knew he was just prodding everyone, but she took offense. Quietly, making a point to ignore him, she crawled into the tent she and Miranda shared. She could feel Wildwind's scowl.

Behind her, Kwazar sighed. "I'll stake them next time."

"I was just kidding. . . ."

"Don't worry about it, Wildwind. Let's get some rest."

Everyone quieted, and Miranda entered the tent.

Still fuming, Annwn said nothing. After carefully unrolling her sleeping bag, she sat on the soft fabric cross-legged. Dripping, Xavier stepped in through the flap.

"Hey, you," she said to Xavier, "you're a sponge. Time for a dry."

Using part of her cloak, she scrubbed the puppy. Xavier protested and performed a squirm that would have shamed most worms. She found caring for Xavier quite soothing, and ignored his protest, maintaining her loving assault until most of the water, and some of her indignation toward Wildwind, had been soaked away by the cloth.

After the drying, Xavier snuggled up to her legs, and immediately fell asleep. The walks were long, and he knew when to take advantage.

Miranda, already lying down, said, "Our water's short. Shouldn't we be collecting rain?"

"I saw Kwazar set out some containers."

"Good. I'm sick of being thirsty. This rationing thing is a drag."

Annwn nodded in full understanding.

"That reminds me," said Miranda. She reached into her cloak and produced part of a ration bar. "Here's your share."

Annwn looked at the precious food. Miranda had been helping her with the Xavier food problem ever since Wildwind's tirade over meals. Annwn still didn't feel right about it. "You don't have to give me that."

"I insist. I've never eaten as much as you. My body's used to it."

"Nevertheless, we should all be working with equal rations. It's only fair, and we all need to maintain our health."

"My point exactly. You're older than I. Much taller. You need more food." She reached over and pressed the life-sustaining brick into Annwn's hand, saying with a plaintive look, "Please. Please take it."

Annwn sighed. "No one can argue with that kind of please. Thanks."

Miranda smiled. "You're welcome."

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After taking one bite from the bar, Annwn carefully dropped the food into a secret pocket that she had sewn inside her cloak. Unperiod, maybe, but quite useful.

"Annwn?" Miranda asked quietly, almost timidly.

Annwn looked up. "Yes?"

"Do . . . do you think our folks are still alive?" Her concerned look suggested that she had been worried for a long time.

Annwn fell silent as a guilty feeling emerged. She had avoided such thoughts because concentrating on survival seemed a more productive response. No. Parts were missing from her rationalization. Maybe, Annwn admitted, she didn't want to think about her parents for the very fears that Miranda had.

"There was time for escape," she finally said.

"But my mom has been working on the magnetic field system and could've been called there in preparation for the big flare."

Annwn shook her head. "I can't say." She thought back to the time their shuttle flew away from the *Atlantica*, just before the large flashes blacked out the bridge window. She remembered seeing objects moving among the stars, a few glowing brightly from gaseous plumes emanating behind them. Some of the lights were undoubtedly shuttles, while others were sections of the ship that had been jettisoned from the *Atlantica* as they were designed to do upon reaching Bode. Before the trip, her father told her the purpose of all the self-contained quarters: "*Atlantica*'s material will be recycled into the colony when we reach Bode, and designing sections with the capability of landing will make the task easy. It's also a safety feature, in case anything happens during our initial acceleration phase." *A precaution,* she thought with a sense of relief, *that obviously worked here at Bode.* She said, "Others did escape. I saw them moving among the stars. Your mom may have been carried from the *Atlantica* before she got anywhere."

Miranda's grim appearance improved. "I'd forgotten about the detachable living quarters!" She pondered the situation a moment. "Mom," she said to the ceiling, "I hope your own engineering yanked you away before you could get your curious nose into the magnetic field generator."

Annwn hoped as well that her parents stayed "home." She could not bear to imagine what she'd feel if she found out that they were killed.

Annwn grew concerned about their own shuttle. "What were those bright flashes we saw, anyway? Were they from the flare?"

Miranda thought a moment before answering, "I don't think so. The flare couldn't have been that bright, or Bode would have been really fried."

"What then?"

"I don't know. Remember that loud clang that occurred just after?"

"Yeah. Like something had hit us."

"I wonder if something exploded . . . and we got hit by debris."

"What would explode?"

"Not much . . . maybe two shuttles collided near us or something. . . ." she let the disturbing thought trail away.

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"There's only a small chance our parents would have been in those colliding shuttles."

"I know," Miranda said, frowning. "It's hard not to worry."

Annwn nodded.

She heard the rain tapping on the circuleaf trees, with the occasional large thump produced by big drops that had collected on the leaves and branches. Nature's wet drumbeats were unhurried, as if time were an afterthought.

Annwn said, "I hope this weather stops soon. We really need to keep moving."

Miranda grimly said, "We may have to brave the elements. It could rain for most of winter, or worse."

"Yeah, if anything, our food supply might not last if we waited."

Miranda gave her a questioning look. "But the food's not what's really bothering you, is it?"

Annwn shook her head slowly, wondering if she should say anything. She didn't want to frighten Miranda. "I wish I knew what was bothering me. Not knowing is so stressful."

"What do you know?"

Annwn thought for a moment. "I think . . . I think we need to get to the colony before winter's end. I don't know why, but we just do."

Looking hopeful, Miranda said, "You're absolutely sure you're not just worrying about the food or something like that?"

"Yes. It's something worse than being hungry, I guess."

"Worse?" Miranda fell silent, lost in her own considerations. She looked afraid.

Annwn felt bad for her. "I'm sorry."

Miranda looked at her. "Sorry for what?"

"Frightening you."

"No, don't worry. I'd rather know."

Annwn became frustrated. *Why can't I just remember?* she thought.

"When you find out what exactly is bothering you, please let me know, OK? Maybe I'll be able to help, if I know what it is."

Feeling assured by Miranda's words, Annwn said, "I'll tell you." She paused, still trying to find the elusive answer. "When I know."

Annwn marveled at the plants they encountered, a variety of leathery-leafed shrubs mixed with several yucca-like species, some colored purple-red, others different shades of green to blue-green. Ground cover comprised of patchy weeds with broad leafy rosettes. Circuleaf trees clustered in gullies, rough barked and squat, foliage beautifully endowed in warm hues. The soil was hard and rocky, but an improvement in comfort over the rough plain that stretched out behind them. The rain had stopped yesterday night, leaving the misty air with a fresh, moist smell.

Her stomach growled, an event occurring with increased frequency. She meandered over to the cart and, opening a container, pulled out a small bar.

Wildwind gave her a look that said, "Too bad you have that puppy, huh?"

Sticking her tongue out, she glared back.

He turned away, pulling the cart as if nothing had happened.

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Annwn noticed that Miranda had been watching the whole exchange silently, wearing a worried expression. She didn't like frightening Miranda, but she was not about to start acting nice to Wildwind either.

She looked at her bar, and almost returned it to the cart. Nothing like anger to destroy an appetite. However, putting the food back would show Wildwind that his prodding was getting to her. She would eat.

Opening the tight wrapping, she took a bite.

Xavier, ever alert for food, pranced over to her. He yipped his expectation and leaped at her feet.

"OK, I'll give you some. Calm down." She stooped and handed him a chunk of the virtually tasteless bar.

He immediately started chomping. Fortunately the tough bar forced him to chew for awhile, keeping him preoccupied so she could eat in peace. "Wait till you get real food, then you'll wonder why you ate this stuff." The thought left her longing for the bland starship food.

Xavier trotted up for a second helping, tail wagging a miniature hurricane.

She gave him another piece, hearing Wildwind's quiet laughter ahead. Understanding the reasons for Wildwind's chuckle, she grew angry again. His persistent attacks were becoming intolerable.

Annwn heard Miranda unzip the tent, and after a noisy paper-like rustling, her friend exclaimed, "Hey! What happened to the leaves?"

Startled, Annwn sat up. Miranda stood on her knees half outside the tent, covered waist deep in a wash of multicolored leaves, some of which had fallen inside to bury her feet. Morning light filtered around Miranda's dark silhouette.

Annwn reached up and pushed on the tent's sloped ceiling. Rasping, the dark circular leaves slid down the fabric, opening a window of light. "We could have slept through the whole morning," she commented quietly.

"Not when you have to go as bad as I do." Miranda stepped outside. "This is so unreal." Feet rustling through the leaves, Miranda walked away from the tent.

Xavier charged outside, drilling through the blocking leaf drift like a mole.

Annwn crawled over her sleeping bag and poked her head out the door. Seeing the hillsides, she gasped. With an alien perfection, not a single leaf remained attached to the gnarled trees, their gray trunks starkly poking above the colorfully draped slopes like a field of gigantic nails.

Kwazar and Wildwind stumbled from their tent, crashing through the leaf-fall in excitement. "I've never . . ." commented Kwazar.

Wildwind wadded up a large handful of the water-lily-sized leaves. He pitched the ball of foliage into Kwazar's face, sending an eruption of glittering yellow and orange dishplate-sized circles around his head. "Leaf fight!"

Kwazar dived down and tossed an armful of leaves at Wildwind.

Wildwind grabbed some of the thrown leaves out of the air, and jumped over to stuff them down

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Kwazar's tunic. "Ha!"

"Hey, those are cold!" said Kwazar. Grinning evilly, he leaped upward with two leafy handfuls, ready to do the same to his assaulter, a flamelike trickle of crinkled circles falling from inside his tunic.

Wildwind ran backwards, kicking out a trail through the leaf cover. "You'll have to catch me first!"

"No problem," said Miranda, as she rushed from densely branched shrubs and stuffed leaves into Wildwind's tunic. Expecting retaliation, she ran away, giggling, kicking leaves up high.

"Hey, that's cheating!" Wildwind called. He tripped and ploughed face first into the soft ground cover, pushing up a tall mound ahead of him.

"Now you're going to get it!" called Kwazar, closing on his victim.

Shivering, Annwn watched her friends' fun, pondering the heavy coat of foliage they threw around. Evidence dropping right in front of her face, and she still couldn't grasp why she felt so afraid.

Higher into the mountains, climbing a steep slope far above a creek trickling through rounded quartzite rocks, she slowly progressed through a thick forest of bare circuleaf trees. The particular circuleaf variety she walked among was a white-barked, medium-high tree with long, graceful limbs. Trampling through springy-soft, ankle-deep leaves, she had yet to spot a plant that retained any foliage, a persistent and worrisome display of nature's grandiosity.

The hill had been carved steeply by the creek. Annwn, in her flat-soled shoes, found herself slipping much of the time. Miranda fared no better, and the boys had been struggling with the cart since morning.

Wildwind, in an obvious attempt to make up, tied the cart's lead to a thin circuleaf tree trunk and offered her a hand up a difficult part of the slope.

"Forget it," she snapped.

He looked sincerely disappointed. "Come on—we all need help from time to time."

"Maybe so, but I don't need it from you. Now, out of my way!"

Frowning, he went back to pulling the sled and its precious cargo up the hill, holding the line over his shoulder and across the top of the backpack. He wore the pack in place of Miranda, who had a hard time carrying its weight uphill.

"I hope there aren't too many more of these ridges," he said. "I'm getting sick of them."

Kwazar, having returned from a short scouting trip, shook his head as he stepped downhill. "Well, I'm sure there are many more ridges to cross."

"Shit." Wildwind yanked the cart forward.

"Annwn," Kwazar asked, "could you lead now? There's a steep part coming up, and I have to help pull the cart." He pointed up the animal trail they followed through the forest. "Those rocks need to be moved."

She grimly nodded, staring at the half-buried, head-sized boulders. They'd been taking turns clearing trail for the cart all day, and her arms were getting tired.

"I'll help you," said Miranda.

Annwn smiled at her friend.

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"Thanks. But don't wear yourself out."

"I'll take things slow."

Annwn picked up Xavier and put him on a less steep portion of the hill above her. Grabbing roots and small circuleaf branches, she climbed to Xavier's new elevation. Turning around, she helped Miranda ascend by giving her a hand. Miranda's breath erupted from her mouth in gasps.

Annwn looked up at dark, ragged clouds swirling among rocky, broken mountain peaks. Wind whispered intermittently through naked boughs, nudging the wood into a clacking sway. An oppressive mugginess made her feel as if she were walking through water.

"Maybe we should stop," said Annwn nervously.

A large raindrop plunged through the branches and burst across Miranda's face. "Maybe it's too late." She rubbed the water away.

"We better get ahead of the boys before it really begins to pour." Using the skinny trees for balance and support, Annwn trudged upward.

She heard Miranda firmly planting her feet into the loamy ground, kicking the slick leaves aside.

"Ick!" said Miranda, "The soil's full of bugs!"

Annwn had seen the animals, dark creatures that only slightly resembled beetles burrowing through the dirt and leaves in a swarm of gargantuan proportions. "Uh-huh. Just ignore them."

"I'll try."

She reached the struggling boys.

A gust lashed the trees into a violent dance and an earth-shuddering clap of thunder followed the gale's scramjet roar.

Rain cascaded down.

A virtual flood from the heavens, the downpour drenched everything with its lukewarm touch. Annwn shielded her eyes, discovering with irritation that water easily dripped between her bony fingers.

"What the hell?" said Wildwind. "I've never seen rain like this before. Not even in a Texas thunderstorm."

"What do we do?" called out Miranda, her soft voice barely audible over the pounding water.

"We've got to get up to more level ground, don't you think?" replied Kwazar. "This hill could give out on us."

"Leave it to you to think like that," said Annwn sarcastically. "How much farther do you think we have to go to get near the top?"

"Do we want to reach the top? What about the lightning?"

"We'll have to take our chances, right? The water's threat is more real."

Thunder rolled, making everyone pause.

Xavier scampered up to her feet, whimpering. She picked him up and wrapped his wet body carefully in her cloak. She looked back at the waiting people. "We've got to do something."

"OK," said Kwazar, "why don't we set up our camp at the first level place that we come across? We probably don't have to travel far."

Everyone agreed. At that moment, Annwn would have believed in miracles.

The two boys hauled the sled uphill, a job made worse by slippery

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leaves and ground quickly going to mud.

Impossible as it seemed, the deluge became heavier. Wind, turning colder with each rain-filled gust, shook trees as if they were pompoms. The hillside livened as a surge of water raced toward the creek below, leaves of all shades spinning and flipping to the torrent's whim. The whole forest floor moved, a multicolored quilt on the fly.

Miranda grabbed Annwn's waist and held tight. "I really don't like this," she said nervously.

"I don't either. Just keep holding on to me." She walked forward, carefully planting her feet in the leaf sludge. Cold liquid soaked her feet. Holding her tightly, Miranda followed.

Reverberating through the wood, a large gust knocked trees over. Annwn's hands grew numb from sudden cold. The rain fell so hard that she feared drowning with each breath.

Annwn encountered a spot where the hill became so steep that walking was impossible. She had to plant her feet into the hillside, poking them through a dirty waterfall, using roots and white-barked branches for handholds.

She turned to Miranda, "Wait here until I get up. Then I'll give you a hand." Pouring from her hair, water rushed into her mouth as she spoke.

Miranda nodded and Annwn climbed.

A large hand appeared in front of her face. Wildwind's. She frowned. "I can get up myself."

"Please."

"No! I've told you!"

"I insist."

She lost control and smacked his hand away. Arm swinging wide, she lost balance and slipped. Grabbing a branch, she stopped her fall.

Xavier slid through her cloak and down the side of the hill. Yelping, he sailed over a lip and plummeted toward the deeply rushing creek.

"No. *No!*" cried Annwn as she turned to go after the puppy.

Wildwind jumped down next to her. "We've ourselves to save! Forget the dog."

Annwn looked at him, her face contorting into a mask of rage. "Never! I'm getting Xavier back!"

"He's dead. Nothing could survive the creek. Just look at it!"

She looked, and saw a turgid mass of shed foliage so thick that she was surprised the water could move at all. His argument convinced her. With a sob, she turned around and climbed.

An oscillating whine sliced pitifully through the hammering rain, sloshing creek and lashing wind, telling the world its woe. Annwn looked Wildwind straight in the eye and said, "I'm getting him!" She stepped down the gooey hillside.

Wildwind grabbed her arm.

Screaming with rage and wrenching her whole body, she yanked her frail limb free from his powerful grasp. Surprisingly, her forceful escape pulled Wildwind off balance. He fell down the steep slope where a bend in the stream had undermined the hill.

With a grunt, Wildwind had firm hold of the sled's rear axle, which stuck out over the edge of the hill about chest height to Annwn. Tires and structural rail grinding through

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the sopping muddy soil, the cart slipped over the edge. Ropes that had been tied around a circuleaf tree pulled taut and abruptly stopped the sled's plummet. Wildwind hung below, hard breaths erupting in steam from his nose, feet dangling four meters above a creek gone mad, a wet hell of flame-colored leaves.

Annwn, confused by the unfortunate turn of events, fell to her knees, mouth agape. She didn't know whether she should be fearing for Wildwind's life, or wishing he would fall, or racing after the crying puppy, or trying to help someone who attempted to hold her against her will.

Mixing with the rain, hail fell, pattering through the trees, becoming a cascade of white popcorn bouncing in haphazard trajectories throughout the wood.

The tree supporting the cart slowly tore from the softened ground. Wildwind dropped lower.

"The cart! We need to retie the cart!" Miranda rushed toward the collapsing tree, her feet slipping constantly on leaves and mud.

"I'm dropping some weight!" Wildwind, with one hand, quickly popped the buckles of the backpack. Annwn tried to yell "No!" but the words stuck in her throat. Falling like a stone, the bag of food sank into the savage creek.

Kwazar grabbed an exposed root and reached over the dangling sled. "Climb up a little ways and I can get your hand!"

The showering ice hurt Annwn's head, pain barely felt as she watched Wildwind slowly pull himself up the sled, straining for each structural support. Fear and cold whitened his face. The circuleaf tree tore from the ground at an increasing rate. Kwazar stretched farther, trying to get as close to Wildwind as possible.

Miranda reached the tortured tree. The sled had two leads. She began to untie the line that had more slack and hadn't been pulled taut. Her cold fingers slowly fumbled with the simple knot.

The root Kwazar held popped loose and he looked at his failing purchase with a shocked expression. The handhold stopped yanking outward, finding grip somewhere under the soil. Appearing relieved, he turned back to Wildwind, discovering that the extra length gave him the reach he needed, at least temporarily.

"Now, Wildwind. Do it now!"

With both arms, Wildwind yanked himself upward and grabbed Kwazar's free hand.

Miranda, having freed the cart's second line, turned toward a firmly braced tree to secure the sled. The lead ripped from her hand, slicing neatly through palm and fingers. Roots from the falling circuleaf tree lashed across her legs, knocking her over.

With the piercing crack and pop of snapping branches, the cart and tree crashed into the flooding creek. The sled sank from sight, sucked under the churning debris almost immediately.

Kwazar wasn't strong enough to hold Wildwind, not even for a few seconds. Clenching his teeth, he swung Wildwind into the side of the hill. Wildwind wrapped his arms around thick exposed roots, holding still as he caught his breath, hail

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bouncing from his shoulders.

Flopping onto the slick mud, Miranda's squirmed in pain.

Annwn heard Xavier whine again. Miranda, looking directly at Annwn, begged for her help. Wildwind, clinging to the roots below, awaited a hand to help him up the ledge. Kwazar, arm twisted from yanking Wildwind to safety, lay on the ground, groaning, rubbing his biceps and shoulder. Unsure, Annwn stood and slowly walked up the hill, toward Miranda. She slipped on the muddy terrain and plunged toward the creek.

Miranda screamed.

Annwn, unnaturally calm, watched the dense circuleaf trees rush past her, the hail skipping everywhere, lightning flickering from all sides, and the edge that Xavier had fallen over race up. . . .

She landed next to Xavier, crashing onto a clump of purple-brown thick-leafed plants. Growing on a bump in the steep slope, the vegetation was the only thing that kept her and Xavier from falling into the leaf-filled torrent rushing just a meter below.

With a happy yip, Xavier climbed through the leaves and licked her face. She gave him a smile and pat, but otherwise paid him no attention, for she fixated on the plant which had stopped her fall.

Dying stalks protruded from the crumpled leaves, their tips covered in fat pods. She grabbed one of the pods with a shaking hand and broke the fruit open between thumb and forefinger. Hard, black seeds fell out, becoming lost among the leaves of the parent plant. Her stomach churned nervously as she watched the tiny seeds fade into shadow.

Flowers.

The realization swept over her with an unnatural mix of relief and foreboding.

Animals running faster than any she had seen before, chasing plants that responded to seasons which were as uncannily swift. The corpse of an animal that didn't move fast enough, was just a few hours too late. Autumn foliage falling as one, denuding a forest overnight. Spring flowers blooming *at once,* choking the air with their poisonous spoor.

Bode's yellow death.

Walking around a large clump of dripping trees, Miranda found Annwn first, her palm still bleeding. "You're OK!"

Annwn immediately felt sorry for her friend's painful wound. "Oh, your hand! Let me help." She tore a length of fabric from her cloak's fringe.

"Are you hurt?" Miranda asked, looking Annwn up and down.

"No," she replied, rinsing the makeshift bandage in the rushing creek. "The plant cushioned me. What's important is your hand."

Miranda calmly looked at her wound. "I think it's slowing down." She reeled and abruptly sat down. "Oh, a dizzy spell."

"You should have stayed put." Annwn gently grabbed Miranda's hand. She removed large debris from the crimson gash. The line had bit deep, yet probably not so deep that—"Wiggle your fingers."

"It hurts."

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"Do it anyway."

She tried, weakly. Her fingers worked properly.

"Good. You'll be fine, once your palm heals. This'll sting a little." Wringing her cloak over the wound, she used the purest water she could find.

Miranda winced silently as the water dribbled over her cut.

After twisting as much liquid from the bandage as her strength allowed, Annwn carefully wrapped her friend's injured extremity. "We'll only keep this on for a little while. We need to air the cut."

Miranda silently watched.

Annwn said, "I'm so sorry! I overreacted to Wildwind, didn't I?"

Miranda gave her a curious look, but said nothing. She didn't seem very happy.

Uncomfortable, Annwn changed the subject, "Where are the others?"

"Kwazar's still helping Wildwind." After a short pause, she blurted, "We've lost the sled. How can we survive?" She looked apprehensive.

Annwn wasn't in the mood to think about such problems. "We'll manage."

"How? What will we eat?" she asked, looking confused. A few tears dribbled down her wet, dirty cheek.

Annwn, disturbed by the question and her friend's reactions, said, "I don't know what we'll eat. But we will manage. Somehow."

Wrapping completed, Annwn examined the bandage closely, making sure it was snug. "I think that'll do. Good thing for first aid, huh?"

"Yeah," whispered Miranda, examining her hand. "I guess I should have left the line alone."

Annwn shook her head. "Don't regret it. You did what you thought was right."

"But I failed. And all I got for it was this." She held out her wounded hand.

"You tried. That's what counts."

Miranda looked closely at Annwn, eyes questioning. "I just wish . . ."

"What?"

She looked away. "Never mind. I'm too tired to discuss it right now."

Smacking the soggy ground, heavy rain fell again.

"How're we going to survive the cold now, without our tents and bags?" asked Wildwind, looking at Kwazar, but certainly directing the question at Annwn.

Cool water dripped from Annwn's hair as she gazed into the surging creek below. She said not a word. She felt guilty—not quite for Wildwind's tumble, but for losing the food.

How would she break the pollen news? Everything worked against them now: the cold, the rain, the lost sled and the fast seasons. She felt very afraid. Miranda, leaning against her shoulder, and Xavier, warm in her arms, gave her some comfort. Maybe they had a chance together.

"You think we can get the cart back?" Wildwind followed up.

Kwazar snorted. "After that flood? No way. If it's not torn apart, the cart is certainly buried by debris and silt."

"Then what do we do?"

"Well, thanks to Miranda, I've an idea." Kwazar ran his hands through his hair, brushing out a cascade of water.

Miranda looked at him in surprise. "Me?"

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"Yeah. Last evening, you reminded me that this planet has a high heat flow. If that's the case, all we need to do is go down into the ground a little ways. We dig."

Wildwind, always on the lookout for a spoiler, said "But dig with what?"

Kwazar thought for a moment. "OK, then we find a cave, or something. Volcanics—fumaroles, geysers—remember, what's that place, Yellowstone? There's got to be stuff like that around here. This planet should be seething with volcanism. Though the quartzite in our location is not very encouraging."

Wildwind, doubtful, said, "Lead the way, rock fiend."

Annwn sat under a lean-to made of large branches and broad circuleafs, feeling miserable from a wet night, but warmly crammed between Kwazar to her right and Miranda to her left. Out of necessity, Wildwind sat to the left of Miranda, away from Annwn. Xavier rested in Annwn's lap, breathing peacefully, the only one who did not seem to mind the cold all the time.

Rain continued falling as the light of morning trickled through small gaps in the walls.

"Caves," snickered Wildwind, mimicking Kwazar, "geysers. Oh, we'll find one. The planet should be one giant volcano."

"Give it a rest, Wildwind," replied Annwn. "Did you come up with anything better?"

"Glad you thought of this lean-to, Annwn," interjected Kwazar, stemming off an argument. "We never encountered anything like this during the Elara sims."

Wildwind shrugged. "That's because Elara had no wood."

"Elara's sim was missing many things that this world has," commented Annwn, attempting to change the subject, but accidentally bringing up an even more disturbing concept.

She had told the three about the poisonous bloom as soon as they were on their useless hike for volcanic terrain. Everyone had taken the information in silence.

"We have to get to the colony by spring," added Kwazar. He pondered his statement. "I never imagined myself trying to outrun a season before. They're so slow on Earth."

"Well," said Wildwind in harsh tones, "we'd have an easier time if we still had our food and tents."

"Shut up!" said Annwn coldly, feeling a renewed surge of guilt about the cart's loss. "The food is simply gone. Deal with it!"

"Because of you, the food's gone! Because of you we all have to suffer. Even that runt of yours is suffering." He gave her a dark look. "And I nearly died!"

Appalled, Annwn said, "Me? My fault? Who grabbed whose arm?! Y-You-You bastard!" She balled her hand, preparing to hit him.

"Will you two *stop?!*" screamed Miranda, holding her arms between Annwn and Wildwind. "Your constant fighting is really scaring me! How can we accomplish anything with you two disagreeing and fighting at every moment? Stop it!" She sobbed, covering her face with her hands, tears splashing onto her stained bandage.

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Annwn angrily grabbed Xavier and crawled out of the shelter.

She paused her stomping at a nearby clump of circuleaf trees and placed Xavier on the ground, somewhat jerkily due to her anger. He didn't mind the treatment, and pranced happily into some denuded shrubs.

She stared at sagging clouds being twisted and torn apart by an invisible wind, letting the rain's cool caress soothe her hot face. Was losing the food really her fault? Was keeping a puppy alive such a crime? Did she have to like everybody?

Kwazar walked up from behind.

Not feeling in a talkative mood, she didn't say anything.

"Look," he said, "You remember that one time you walked out of the ATV, saying, 'Oh, it's just a sleeping herbivore'?"

Annwn, too tired to become embarrassed at the Elara recollection, couldn't help a small chuckle. "Yeah. What a way to learn about monopouncers." The encounter had been quite a shock.

He made a jaw shape with his two hands and clapped his fingers together, imitating a mouth. "Snap!"

"Elara's no place to hike!"

"And," he seriously replied, "Bode really isn't all that different."

She reluctantly nodded, knowing where the conversation was going. "My pigheaded attitude just doesn't seem to be very good for survival situations." Depressed, she sat down, the wet ground litter not improving her cold rear any.

She saw the point of Elara now. Teamwork. Everyone had to work together to make things happen. Funny how it took a real situation to make her realize the importance of Elara's lesson.

"If it makes any difference, Wildwind is more pigheaded than you. Nothing's been easy about him."

"I know." She paused, feeling a little guilty. "But I can't be right all the time either." She sighed.

Winter's cool breath blew through the trees. The clacking twigs were already budding. Spring in only a few more days!

Springtime thoughts brought a chill down her spine. Not many hours remained before the world would explode with new life's spoor. Maybe they should have stayed back at the crash site, like Wildwind had wanted. There were fewer plants on that barren plain of rock. But the sparse vegetation might even produce enough pollen to bring death.

Deciding to leave her to her thoughts, Kwazar walked off, saying, "I'm going to talk with Wildwind."

"Wait," she said.

Kwazar stopped and looked at her.

She hesitated before saying, "What keeps you from getting angry at Wildwind's behavior?"

"I guess I don't take his stuff personally."

"Ah. I don't know if I can do that."

"Do it for Miranda then. She's really bothered by your fights." Kwazar turned around and slowly walked toward the lean-to.

More guilt surged within as Kwazar's words made her realize how little she had considered her friend's feelings during her battles with Wildwind. Annwn remembered the short

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conversation while she was bandaging her injured friend. *That's what Miranda was asking,* she realized. Miranda had been afraid of angering her, so she kept quiet. Annwn shed a tear, one that became lost in the rainfall trickling down her face.

Xavier walked up and licked her cold hand. Seeking comfort, she stroked his soggy fur, but felt all too clearly his ribs underneath. Reminded of food, she found her stomach growling painfully. What race were they running? Against hunger, or against the pollen? Against her past mistakes, or against Nature's complex ways? More depressing thoughts adding to a sad morning.

"Hurry!" yelled Kwazar from the top of the saddle, cupping his hands to help his voice carry over the steady wind whipping through the gap. "See the view before it's blocked!"

"I'm there in a minute!" Miranda looked at Annwn. "Come on—let's walk faster."

"Go ahead. I'll be there shortly." She winked.

Miranda smiled in understanding. Turning away, she rushed at her best speed up the small grade, a trot slowed from the lack of oxygen and food. Xavier scampered behind her.

Annwn and Wildwind were left alone, trudging through the small accumulation of snow that fell during the afternoon eclipse. Annwn shivered under her damp cloak, hoping dearly that the ridge was the highest one they'd have to traverse.

Now seems like a good time, she thought.

Turning to Wildwind, she said stiffly, "I'm sorry for my actions. I shouldn't have endangered you, and the others."

He smiled. "It wasn't all your fault. I'm to blame as well . . . so I'm sorry, too." He held out his hand.

Hesitating just the slightest, she shook his hand.

"But don't get me wrong," she said, pulling from his grip.

He frowned. "Hm?"

"I don't have to like you," she said, face emotionless, "and I don't. I'm just forgiving you for your actions so we can work together without fighting."

He paused, apparently debating how to respond. "Understood." Looking at the ground he said nothing more.

She turned into a biting wind that made her head ache.

"Hurry up you two! The view's getting covered."

Kwazar didn't need to yell, for Annwn had already reached the top. She stared out over a sea of hills lapping the base of the ridge. Low clouds poured in from the west below her, racing to meet the mountain's foot straight under her numb feet. Shrouding the horizon, turbulent puffs mushroomed high into the sky, their edges muted by thick haze. Stacked lenticular clouds capped the peaks to her left and right.

"I think," said Kwazar, "another storm is approaching."

As he spoke, the hills below faded behind the racing scud. The clouds billowed up toward the party, torn edges twisting, dissolving, reforming.

"I won't disagree with you," said Annwn, shivering in a strengthening wind. "We had better get down from here."

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"Yeah," said Kwazar, "it wouldn't take us long to freeze in these conditions."

"Oh, my legs," said Miranda. "I don't know if I can walk much farther." She looked tired.

"All downhill from here," said Wildwind.

"True."

A strong, insistent gust of wind rippled over the ridge, nearly toppling everyone. Annwn had to shield her eyes from biting snow crystals.

Miranda, teeth chattering from the gust's cold grasp, said, "Rubber legs or no, I'm going down."

As one, they headed downhill. Clouds surged around them, darkening the ridge, and a light snow began falling.

Another day wore slowly on, comprised of clouds, wet marching, falling down slippery slopes, cramped muscles, restless sleeps, desperate attempts to forget about food and drinking the ever-present rain. The only improvement was warming temperatures, and such weather disturbed Annwn: spring neared. *The race,* she thought, *we are losing to the seasons.*

She could hardly move her aching legs, a task made particularly difficult by the slight slope she had to climb. When she'd reach the top, she'd have to go down again, only to walk straight into another rise. The rolling ridges of the coastal mountain strip seemed to continue forever. Fortunately, the closer they got to the coast, the lower the hills became, with shallower gradients. Such slow change was subtle, but it gave her hope.

The woods slowly grew darker. How much longer until night? She couldn't tell how close the sun was to the horizon, for the clouds were too thick, hanging so low they appeared to scrape the barren branches above.

Tiredly she said, "Guys, let's stop here." Before they could respond, she sat—almost collapsed—down, leaning her back against a leaf-bare tree, moaning from the ache in her legs.

"No argument here," said Miranda as she fell beside Annwn. She looked sad. "I don't know how many more steps I can take."

"Me neither." Kwazar sat against a circuleaf tree a meter off, with Wildwind lying next to him.

"If we could eat even one plant, things would be so much better," Wildwind said, his words slow and tired.

Was her tiredness due to hunger, Annwn wondered, or just the drastic change in her daily schedule due to Bode's very long days? If she had food, she realized with frustration, she could answer that question. Feeling a lump at her side, she remembered the secret pocket she had sewn into her cloak. She reached in and pulled out the half bar Miranda had given her many nights ago. "Hey, guys, I have food!"

"What?" said Wildwind. "I don't believe it." Kwazar and Miranda looked at her expectantly.

Annwn held up the small meal. "I forgot I put this in my pocket." She broke the bar into quarters. "We'll all get some."

She passed three pieces to Miranda, keeping one for herself. Miranda took a section and passed the remaining on.

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"Enjoy it," said Annwn. "That's our last meal."

"Well, don't say it like we're going to die or something," said Kwazar.

Xavier walked up to her, tiny tongue hanging from an open mouth.

"You'll get yours, too," said Annwn. She halved her section and gave a piece to the puppy. Xavier happily ran off with the food, chomping quickly.

She placed her tiny piece in her mouth and chewed slowly, trying to make the meal last. The others ate as well.

After the meager dinner everyone rested silently. A slight breeze rustled through the forest's thickly budding crowns, carrying a zephyr across the moist forest floor and into her face, a cool caress that left her shivering.

Panting from his latest workout, Xavier walked up to Annwn looking for more food.

Annwn held up her hands. "There's none."

Realizing no food could be had, Xavier jumped into her lap. He fell into a deep sleep, his furry body warming her legs. Annwn nodded off as well.

"Guys," said Wildwind, forcing Annwn back into the real world, "I know you're going to hate me for this, but I have a question."

After a pause, Kwazar said, "Go on, don't leave us hanging."

"Well . . . where exactly is the colony?"

"We already told you," said Kwazar.

"Yeah, I know that," he said, irritated. "I mean exactly. The west coast is big. How do we know we're anywhere near the colony site?"

"Good question," said Kwazar.

Miranda remained silent.

Annwn gasped in shock and looked at Kwazar. "You mean, you don't know where the colony is?"

He shook his head, "No."

She sank low, sliding down the tree she leaned against. "We might as well just die here." Sighing, she stared at the tips of her ragged, dirty shoes.

"Don't say that," said Miranda, who finally seemed to find the energy to talk. "I've been doing some thinking."

"You have?" said Kwazar, teasing her, tiredly.

She paused to gain her breath. "I remember that the colony is just south of thirty-six degrees north."

"And," urged Wildwind.

"We're experiencing seasons, right?"

"Yep."

"Which means that we can't be too far south, or we'd've not seen much of a change, not as drastic as the change we've witnessed."

"True, but we could be way far north," retorted Wildwind.

"Not if we've experienced total eclipses. Only regions thirty-seven degrees either way of the equator gets complete blockage of the sun."

"Great thinking," commented Annwn. "We may not be all that far after all."

"Well," added Wildwind, "she hasn't exactly pinpointed the colony's location."

"No," Miranda admitted, "I haven't. I've only isolated our position within an area of a few degrees."

"Yeah, and how big is a degree? One hundred klicks? More?"

"We could still be weeks away?" asked Annwn.

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"Yes, I'm afraid so. Sorry for getting your hopes up."

Everyone quietly stared at the sky, lost in their own thoughts.

Feeling evening's chill, Annwn wrapped herself carefully in her tattered cloak. Xavier, inside the cloth, snuggled next to her leg and went right back to sleep. "I'm resting, guys." She lay her head on the cloak's dirty hood, a meager pillow. Before finally dozing, she wondered if she would wake up choking on a flood of pollen. Hopefully not.

Briefly awaking Annwn, her friends lay next to her, sharing what little warmth they could offer, which, despite her isolation and despair, left her with a very secure, comfortable feeling, one almost like home.

Annwn awoke grasping Xavier tightly in a pitiful attempt to get as much warmth from his scrawny body as she could. Miranda held her just as firmly, shivering from the cold. Bright streamers of sunlight poured between the green water-lily-like foliage of the circuleaf trees, casting circular and triangular pincushion shadows on the loamy soil. The day would warm soon, judging by Barnard's brilliant white luminescence.

The foliage wasn't there yesterday! Yet there the leaves were, covering all the trees in a dense canopy of green like none other she had seen since leaving Earth. Today would be the day, the great pollen burst.

She didn't know whether just to lie on the ground, hugging Xavier for comfort and succumb to the inevitable, or run. Indecisive and very tired, she momentarily studied the beauty of a world that she grew up thinking was too far away for her ever to visit in person, a world almost magical in its distance and in the marvels which thrived on its surface. Now she was here, in a wonderland gone mad, a wonderland that could kill with a single breath, a world to be feared and respected.

A breeze picked up, washing gently through the treetops, carrying a musty, salty scent. She had experienced that smell before, while walking the beaches of Mendocino. What a wonderful time that had been, running back and forth on the sand, climbing rocks, watching huge breakers crash ashore. Swimming among the waves, a large seal had paused and stared intently at her. She never could forget the intelligence behind the gaze—she honestly felt as if the seal studied her more than she studied it.

A strong gust carried the scent thickly into the wood, wafting sharply around her nostrils. She remembered asking her father why the Mendocino wind was so strong, and so cold, despite it being midsummer. He explained the onshore effect, and how warming air from the hot Sacramento valley rose, causing air cooled by the ocean to be pulled inland. The ocean air was fresh air, cleaning San Francisco out on many a summer day that would have been polluted, keeping the city breathing in the twentieth century.

With a surge of adrenaline, she stood up. Xavier wobbled to his feet and stretched. Miranda rolled to her side and moaned. "Everyone!" Annwn yelled. "To the beach! We're almost there! *Run!*"

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Wildwind pushed himself upright with shaky muscles. Dead leaves fell from his backside. He groggily looked at Annwn. "Huh?"

"The beach," she yelled, unable to control her excitement, and pointing westward, down the slope, "it'll be safe there!"

"Come on, guys!" Wildwind urged. He trotted down the hill with a slight stagger, pushing through thick foliage that hadn't been around yesterday evening.

Kwazar slowly stood up, staring at Miranda's unmoving form. Looking at Annwn, his expression asked, "You need any help?"

"Get moving," she said appreciatively. "I'll attend to Miranda."

He nodded, understanding. "She's your best friend." Turning around, he crashed along the path that Wildwind had made, having a difficult time finding his way among plants which had almost completely rebounded. Xavier, yipping in excitement, followed Kwazar, becoming lost to sight among the greenery.

Kneeling, Annwn gave Miranda a gentle shove. "Are you awake?"

Miranda turned her head and opened crusty eyes. "Barely," she whispered.

"We've got to go," Annwn said seriously.

Maintaining her whisper, Miranda said, "My body doesn't want to move."

Shocked at Miranda's words, Annwn replied, "You have to!" Annwn helped Miranda to her feet.

Miranda cried out in pain, and shed a few tears. "Oh! My legs. They're so stiff."

"You think you can walk?"

Miranda shook her head. "I need help."

Wrapping Miranda's arm around her shoulder, Annwn walked in the direction Wildwind and Kwazar had rushed. Miranda shivered, and she took small steps, keeping her legs straight.

Annwn carefully guided Miranda, feeling dizzy, her stomach a creature scratching from within, desperately seeking food.

Xavier continued yapping ahead, a good thing, Annwn realized. His noise would give her something to follow if she lost her direction sense in the densely growing foliage.

"Miranda, I know you're not feeling well. But we've got to hurry. These plants aren't waiting."

"I'm trying," Miranda gasped. "Pull me, and I'll follow."

Annwn accelerated, running as hard as she thought Miranda could go. Miranda's firm grip reassured her.

Once barren, the forest floor writhed with stems and leaves from seeds and bulbs that had erupted during the night. The rapidity of growth shocked her. If she were willing to stop, she was absolutely sure that her eyes would catch the vegetation stretching upward in real time.

She forced her tired, aching legs into a faster pace. Miranda breathed in ragged gasps, keeping Annwn's speed.

Leaves and flower stems grabbed her, wrapping around her tiny wrists and nimble ankles. She got the feeling that the plants were trying to stop her, actually wanted to poison her and Miranda with their pollen. No!

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She kept pushing forward, twisting and spinning through the dense vegetable matter, carrying Miranda almost solely on her own momentum as if she and her friend were performing a strange dance, an adagio to Bode's spring. Circuleaf branches slapped her face, snapping with tiny pops. Large budding stalks bowed to her determination. Thick, fleshy leaves whined and crackled underfoot. Trees shuddered their protest as she shoved them aside. Small colorful creatures buzzed their annoyance at her rampage, spiraling around her in a deranged, alien accompaniment.

A fire burned in her chest as her lungs sent their message for more oxygen. She couldn't feel her legs anymore, and marveled at how the two abused limbs kept moving, carrying her forward through the instant jungle of their own accord. *Miranda,* she thought, *keep moving, please keep moving.*

Exotic smells excited her nose, some familiar, some strange. A tangy, minty scent reminiscent of Idaho's sagebrush after a summer shower. Sharp, musty, like shelf fungus growing in a California redwood forest. Sweet, sugary, as if from the honeysuckles that grew in her backyard. Warm and overpoweringly sour, like the icky tar from La Brea. Luscious pine sap, as if from the stand of Douglas fir she had played among. Spicy eucalyptus, elongated leaves flickering in a cool Sausalito breeze. Nauseating gasoline fumes, left over from a bygone era. A fit of sneezing overtook her, causing her to stagger through the flood of plants. Her sinuses filled with mucus, shutting down the olfactory sense while dribbling from her nostrils.

White flower clusters unfurled around her. As if producing colored smoke, the blooms spewed small clouds of spoor. Pollen drifted directly into Annwn's reddening face. Surprised that she didn't die outright, she thought, *Maybe one needs to inhale a lot of pollen.*

Pseudoinsects pounced upon the blooming stalks with reckless abandon, gathering in a thick multi-hued frenzy, feeding eagerly, their small bodies becoming powder-coated. Some landed on her sensitive cheeks in an effort to eat the little grains that had affixed to her skin. Other microfauna licked at the nectar spattering all over her as generous flowers slapped every extremity. Irritated, she shoved the spherical blooms from her path, slapped the alien bugs from her hair, and shut her eyes against the thick clouds of pollen.

Glancing back through puffy eyes, she saw Miranda quietly crying, tears eroding wavy rivulets over a face coated in ugly patches of sticky plant juices and dried blood from small scratches. She desperately maintained Annwn's increasingly frantic pace, gripping fiercely with both hands.

Annwn tightly shut her eyes against the blinding luminescence reflecting from the water. Tripping on soft ground—sand!—she fell to her knees, realizing that the cold breath of a fresh wind buffeted her numb, foliage-slapped face. She flopped to the ground, lying prone, her cheek resting in the sand, torso heaving in an attempt to bring oxygen to her de-

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prived muscles. Miranda, gasping, collapsed beside her.

Annwn now knew which race she had been running. And she had won. Her success was enough to calm her. With the feeling of tiny cold feet stepping on her back, she fell asleep.

A low rumbling awoke her. Frightened, she looked up, and regretted the motion for her ravaged sinuses ached severely. Her nose completely stuffed, she had to breathe through a sore mouth. Where were the others? She saw them, lying about in the sand, illuminated by an afternoon sun, all sleeping. Miranda seemed peaceful in her rest.

The breeze had grown strong while she slept, rushing inland with an assuring force. She looked back to the forest from which they had emerged, the wind whipping her long snarled hair about her face, knocking off caked sand.

Her jaw dropped. The mountains glowed with the bright colors of flowers desperate to get their spoor out and about before winter's next onslaught. Insect-like creatures darted in circles, seeking out copious food, glittering in the sunlight as the wind tossed them like snowflakes. Billowing and swirling, a blizzard of pollen made the sky yellow-green, save for the clean stretch behind her, offshore, glowing a refreshing indigo blue.

The wind would carry the eruption of yellow dust deep inland, probably even across the basalt plain to the site of their crash landing. Now she knew why she had been so insistent on walking to the colony, instead of waiting at the smashed shuttle. Their only hope had been to be on the beach, in the safety of the breeze. But would the breeze last through the night, when the inland heating stopped. . . ?

Growing more intense, the rumbling brought flashbacks of the herd that had assailed them. She stood up. Her legs responded with painful spasms and shook continually as she held her stance. Never had she been so weak, so in need of food.

The deep reverberation issued from the north, but she could see nothing over a large dune. Stiffly, she walked to the sandy hill, and began a lethargic attempt to climb the crumbly face. Progress was slow. Xavier ran ahead of her, reaching the top with puppyish ease. Ears blown back by the force of the wind, he stared at something bothersome, his mistrust marked by his down-curled tail.

"What is it now?" she sighed. "What more can this planet throw at us?" She slipped almost as far down as the gain she achieved with each step. She already breathed hard from the effort.

The rumble changed in pitch, almost hurting her ears, drowning out the wind's sorrowful whistle. She looked up fearfully, realizing that she wouldn't reach the dune's top in time. Xavier ran down. A heavy shadow passed overhead, thundering with the intensity of a machine.

Annwn collapsed as Xavier collided with her legs. Her gaze followed the huge, noisy object as she dropped backwards. A ducted-fan craft. The vehicle slowed, turning in her direction. Maybe the pilot saw Xavier standing bravely at the tip of the dune, his beau-

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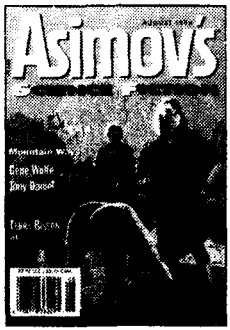
tiful gray coat ruffed by the breeze.

The craft landed at a safe distance, loose sand billowing upward as it delicately touched ground. From her upside-down vantage she could see people exiting the craft. One figure looked like her father. He had survived, which probably meant her mother had as well! "Dad." She tried to shout the word, but it only came out as a whisper. "I'm glad to see you." Too distant to hear, he quietly continued his urgent trot across the soft sand. Nevertheless, Annwn found the words satisfying to speak. As he neared, she used what little energy she had left to sit up, surprised by the strong desire for a hug that exploded through the shell of suppressed worries she had about her family. Xavier, standing next to her, ears alert, tail steady, watched the strangers with intense blue eyes. "Don't worry, Xavier," she replied, barely able to hear herself. "They're friends. We'll be safe now. Go say hi."

He ran off, stealing the first greeting. ■

For Sil

I wish to thank these people for their help in making "The Flowers that Bloom in the Spring" a reality: G. David Nordley, Nancy Zuidema, and the members of Avalon Rising, whose music is always an inspiration.



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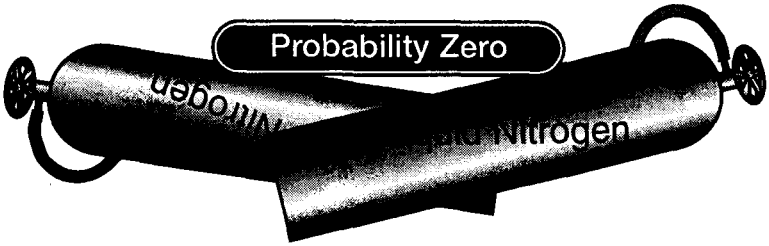
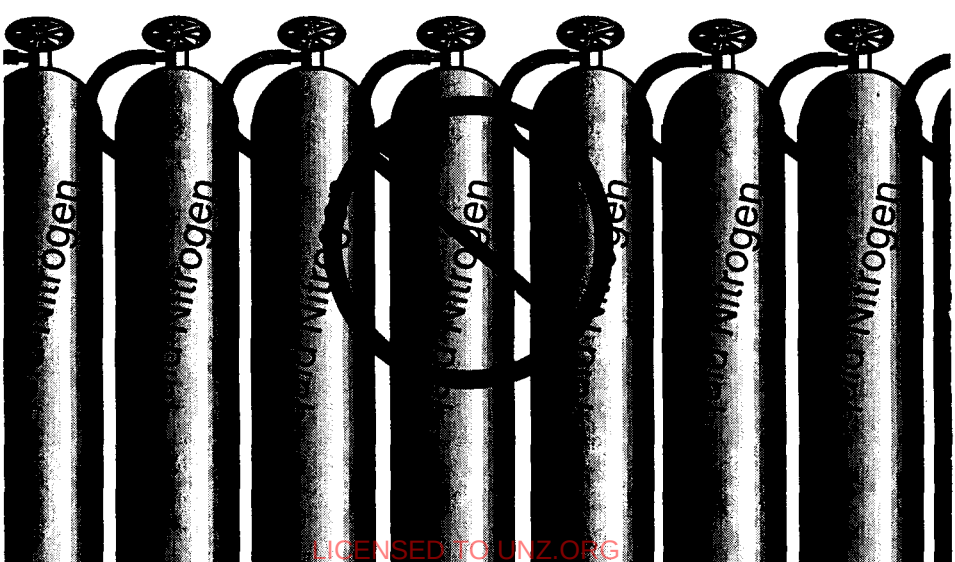


LOWER THE RIVER

Ben Bova



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Jackson Klondike did not look like a world-class physicist. He was a shaggy bear of a man with a gruff manner and a ferocious sense of humor. Yet he was the unchallenged leader of the Rockledge Research Laboratory's bright and quirky scientific staff.

William Ratner did not look like a research lab director. He was astonishingly young, astoundingly handsome, and incredibly vapid. Yet he held a master's degree in business administration, and the Rockledge Corporate officers (including his uncle Sylvester) had handed him the directorship of the lab.

With one single demand: Get results!

Klondike was smolderingly unhappy as he sat in front of Ratner's desk. It was obvious that he felt the time spent in the director's office was wasted; he wanted to be back in his own rat's nest of a lab where he could do some creative work.

Ratner had peeked into Klondike's lab only once. It looked like a chaotic mess, wires dangling from the ceiling, insulated tubing snaking everywhere, and vats of some mysterious stuff boiling and filling the chamber with steam that somehow felt cold instead of hot.

Klondike was the resident genius, though. His specialty was solid-state physics. For years he had been experimenting on superconducting magnets.

"I have a directive here from corporate headquarters in New York," Ratner said, as sternly as he could manage, rattling the single sheet of paper in one hand.

Across his desk Klondike sat straddling a chair he had turned backward, leaning his beefy hirsute arms on the chair's back, his chin half buried in their hair, his eyes glowering at Ratner.

"A directive, huh?" Klondike vouchsafed.

Sitting up as straight as he could, Ratner said, "I know you don't think much of me, but I've been studying this superconductivity business for several weeks now."

"Have you?" Klondike's voice rumbled from somewhere deep in his chest, like distant thunder.

"Yes I have," Ratner said. "Superconducting magnets could be a major product line for this corporation, if it weren't for the fact that you need to keep them cold with liquid oxygen."

"Liquid nitrogen," reverberated Klondike.

"Nitrogen. That's what I meant."

"Used to be worse. When I first started in this game, we hadda use mother-lovin' liquid helium for cooling the coils. Liquid nitrogen's easy."

"But it's still a problem, as far as practicality is concerned, isn't it?"

"Nah. The real problem's the ductility of—"

"Never mind!" Ratner snapped, unwilling to allow Klondike to snow him with a lot of technical jargon.

Klondike glared at him, but shut up.

"I know what we need, and I made the suggestion to corporate management. They agree with me." He rattled the paper again.

Klondike remained in scowling silence.

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"What we need is a superconductor that works at ordinary temperature, so we won't have to keep it cold with liquid—uh, nitrogen."

Klondike lifted his chin off his shaggy arms. "You mean we oughtta produce a room-temperature superconductor?"

"That's exactly right," said Ratner. "And the corporate management agrees with me. This directive orders you to produce a room-temperature superconductor."

Barely suppressing his disdain, Klondike replied, "Orders me, huh? And when do they want it? This week or next?"

Ratner smiled shrewdly. "I'm not a neophyte at this, you know. I understand that breakthroughs can't be made on a preconceived schedule."

Klondike glanced ceilingward, as if giving swift thanks for small mercies.

"Any time this fiscal year will do."

"This fiscal year?"

"That gives you nearly six months to get the task done."

"Produce a room-temperature superconductor in less than six months."

"Yes," said Ratner. "Or we'll have to find someone else who can."

Five months and fourteen days went by.

In all that time Ratner hardly saw Klondike at all. The man had barricaded himself in his lab, working night and day. His weekly reports were terse to the point of insult:

Week 1: Working on room-temperature superconductor.

Week 7: Still working on r-t s.

Week 14: Continuing work on r-t s.

Week 20: Making progress on r-t s.

Week 21: Demonstration of r-t s scheduled for next Monday.

Ratner had been worried, at first, that Klondike was simply ignoring his instruction. But once he saw that a demonstration was being set up, he realized that his management technique had worked just the way they had told him it would in business school. Set a goal for your employees, then make certain they reach your goal.

"So where is it?" Ratner asked. "Where is the demonstration?"

Klondike had personally escorted his boss down hallways and through workshops from the director's office to his own lab, deep in the bowels of the building.

"Right through there," Klondike said, gesturing to the closed door with the sign that read: ROOM TEMPERATURE SUPERCONDUCTOR TEST IN PROGRESS. ENTRY BY AUTHORIZED PERSONNEL ONLY!

Feeling flushed with triumph, Ratner flung open the insulated door and stepped into—

A solid wall of frozen air. He banged his nose painfully and bounced off, staggering back into Klondike's waiting arms.

Eyes tearful, nose throbbing, he could see dimly through the frozen solid air a small magnet coil sitting atop a lab bench. It was a superconductor, of course, working fine in the room temperature of that particular room.

Klondike smiled grimly. "There it is, boss, just like management asked for. I couldn't raise the bridge so I lowered the river." ■

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Jeffery D. Kooistra

PARADIGM SHIFTY THINGS

A personal account of ongoing research into the world of weird science.

Unfortunately, it seems that today most scientists believe that the real lesson to be learned from Galileo's experience with the Church is that religion and science don't mix. This is unfortunate because by far the most important lesson is that a world view (or scientific paradigm) like Geocentrism, which had held sway for thousands of years; had explained motion in the heavens; had made it possible to predict the positions of the planets accurately a thousand years into the future with its ingenious architecture of epicycles upon epicycles—could be entirely wrong.

This lesson about world views is still true today and the purpose of this article is to highlight some of the odd and perplexing scientific results out there in the world that contradict our current understanding of both the history of the Universe and how it works. I do this because: 1) I think it's important; 2) I hope some of these ideas will find their way into stories my colleagues might write, and; 3) I hope readers may take up the challenge to investigate some of these findings themselves.

But be forewarned. I am about to call into question our accepted views on relativity theory, field theory, human evolutionary history, and anthropology.

And I'm going to reference real experiments and data to shore up my views.

We might as well start with gravity. Suppose the Sun were to disappear *poof* ten seconds from *now*. How long will it take the Earth to notice?

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"About eight minutes," someone yells from the audience, for that is how long it takes light to reach us from the Sun. But what about the force of gravity holding us in orbit? "Same thing!" comes the cry. "The Earth won't fly off on a tangent until eight minutes after the Sun disappears."

But this is wrong.

Go ahead, look it up—find the equations we use to calculate orbits, even for items as far away from the Sun as Pluto, where it takes sunlight around five hours to reach. There is no light-speed delay built into the equations. "Ah, but that's just because even a five-hour delay is trivial for something as big as the Solar System." Uh uh. Try running a computer simulation assuming a light-speed delay on the propagation velocity of whatever it is that mediates the gravitational force. Know what happens? The Solar System falls apart. In fact, about 200 years ago, Laplace calculated that the maximum propagation delay allowable to gravity would require a speed of something like ten million times the speed of light. With modern measurements, we can now set the limit at about ten billion times c.

But, Einstein showed that spacetime is curved, you might say. The planets follow geodesics in spacetime, so what is really happening is that the planet isn't being attracted by the Sun so much as it's following a deformation set up by the Sun. But this is no help, I'm afraid. You see, the Sun is moving. That curvature of space due to the Sun is constantly moving with the Sun—so for Pluto to know how to orbit, the Sun is somehow going to have tell that bit of curved space where Pluto is *going to be,* in five hours, how to distort properly to reflect a position where the Sun *hasn't even arrived at yet.* To do that you're still going to have to invoke something moving at ten billion c to bend space properly.

But it would be better to look at such a wild claim with a bit of observational evidence in hand. In your head, draw a straight line connecting the Earth with the Sun. Because of the light-speed delay of the light leaving the Sun, the radial rays that strike the Earth eight minutes hence are those that left the solar surface just ahead of the spot where the line touches the Sun. They thus arrive a tad bit bent at Earth. This is called aberration and amounts to about 20 arc seconds. (In other words, the Sun's apparent position in the sky appears 20 arc seconds displaced from its instantaneous, or geometric, position.) Now, if gravity were mediated by gravitons traveling at light-speed, you would expect to find the force vector pointing from the Earth to the Sun also deviating by 20 arc seconds from the geometric position. This force vector can be measured, albeit indirectly, by highly accurate radar ranging to other planets. As best we can measure, the deviation is zero.

For those theorists out there already sharpening your pencils, spare yourselves the effort. Unless you can point to *experimental* data that demonstrates that gravity is mediated by light-speed-limited gravi-whatsits, I don't much care what you have to say. Theories are a dime a dozen, and theories

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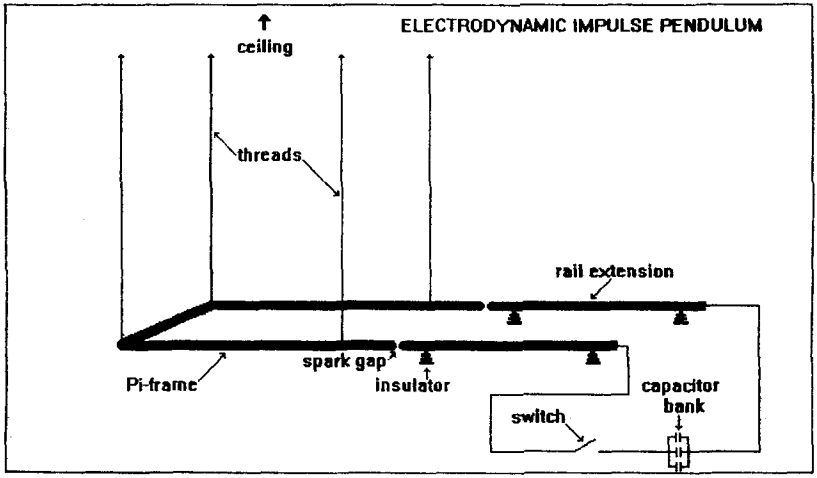
assembled not to explain observations noted in nature but to save other theories aren't worth even that much.

If you're wondering from where I get this stuff, I'd like to point you in the direction of *Dark Matter, Missing Planets, & New Comets: Paradoxes Resolved, Origins Illuminated*, by Tom Van Flandern. Tom used to direct the Celestial Mechanics Branch of the Nautical Almanac Office of the US Naval Observatory, and was on the team responsible for the discovery of Pluto's moon Charon. He has since formed Meta Research, Inc., a scientific nonprofit corporation "founded in 1991 in response to the broad problem of getting support to do research on promising but unpopular alternative ideas in astronomy which have trouble getting funded from the usual sources." The reason the ideas have trouble getting funding is because they are usually paradigm shakers. The Meta Research Bulletin presents and highlights information and theories that don't fit into the "accepted view of things."

The book covers a good deal more than problems with gravity, including the real source of comets and asteroids, and for my money provides a far more complete account of why the Solar System is as we find it than the collection of *ad hoc* explanations that make up Establishment opinion. (And you writers out there will find within the book a myriad of story ideas.)

OK, looking at gravity was a bit disquieting, so let's go to some thoroughly mined-out territory—that of electromagnetic theory.

Consider, if you will, a rectangular copper frame, a meter long, 30 centimeters wide, with one short side removed. This looks something like the Greek letter Pi, so we will call it a Pi-frame. Ordinary copper rod a few mil-



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limeters in diameter will work nicely, though later we'll change this to copper strip. Hang it from the ceiling with cotton threads so that it lies in a horizontal plane, forming a flat pendulum. Take two more straight copper rods and mount them on insulated stands so that they form straight current rail extensions of the long legs of the Pi-frame. Make an electrical connection between the rails and the frame with mercury-filled cups. (*Nota Bene:* Though the inventor used mercury-filled cups, be forewarned that these are not simply spill-prone, but spill-inevitable. Mercury has a high surface tension, and beads up nicely, so with a little ingenuity you can use it to make low-friction, temporary connections like those needed here. But the EPA won't like it no matter how you do it. The figure shows the spark-gap approach, explained below.) Connect the rails to an ordinary 12-volt (1000 Cold Cranking Amps!) car battery. Be sure to include a heavy switch.

Close the switch. The frame will pull out of the mercury-filled cups and swing away from the rails. When the frame ends leave the mercury cups, the current stops and the electrodynamic force on the pendulum ceases. The experiment is over when the pendulum reaches its maximum initial displacement.

This is called an "electrodynamic impulse pendulum" and was invented in the early 1980s by Panaiotis T. Pappas, a physics professor at the University of Athens. By measuring the swing amplitude, the mass of the pendulum, and the length of the cotton threads, you can calculate the momentum which was imparted to the pendulum by the electrodynamic impulse.

Let's back up a minute and do some undergraduate physics student thinking about this setup. After the switch is thrown, the current flows up one leg of the Pi-frame, across the short side, and down the other long end back to the battery. The flowing current sets up a magnetic field, and using the right-hand rule (fingers in the direction of the magnetic field, thumb in the direction of the [traditional] current flow, the force points straight out of your palm), one can figure out the directions of the forces. According to Lorentz's force law, the magnetic field set up by the two long legs and the rails pulls the frame forward by acting on the current in the short side, and this is why the pendulum swings. (For completeness, I should add that the two long sides also act on each other, and this force tends to push the two legs apart, as does the force due to current flow through the short side. None of these forces contribute to the swing.)

Now here's the problem. According to accepted relativistic electromagnetism, with its interactions of fields and photons, momentum conservation requires that the initial pendulum momentum must be equal to the destroyed field energy momentum (in modern EM theory, fields contain energy, which is not the kind of field Newton was talking about). In other words, we can calculate the total amount of energy that must have been given up by the battery for the pendulum to swing in the observed fashion.

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But, as experimentalists, we can also *measure* the amount of energy *actually delivered from the battery.*

When you do this you find that the energy actually expended by the battery is a thousand times less than the energy value calculated from theory.

Hang on—there's more.

Recall that according to the Lorentz force law, the force that moves the pendulum acts on the short leg and pulls the long legs with it. There is *no* force in conventional theory acting on the long legs in the forward direction.

So what makes the long legs buckle accordion fashion, as if they've been *pushed,* even *hammered?* Back to this in a minute.

Once again you're no doubt wondering from where I got this stuff. This time it's *Newton Versus Einstein*, by the father and son team of Peter and Neal Graneau. Dr. Peter Graneau has long worked in experimental electrodynamics, and the paper by Pappas came to him for review. Graneau recognized the important implications of the experiment immediately and set out to try it himself. Being in the wealthy west, he was able to greatly improve the experiment. He used a capacitor bank instead of a battery and with the higher voltage was able to do away with the mercury cups entirely and just spark across the gap between the frame and the rails. When Graneau repeated the experiment, he found that the needed energy calculated from accepted theory to swing the pendulum was more than 2,000 times greater than the actual energy discharged from the capacitor. (This ignores line losses and energy lost in the spark gap—the actual energy that moved the frame was more likely about 10,000 times less than the calculated amount!)

Another thing Graneau did differently was to use copper strip, one centimeter wide and one millimeter thick, for the Pi-frame. This makes it easy to notice that the tips of the long ends buckle and deform as if receiving hammer blows. This is caused by longitudinal Ampere forces and you won't find them mentioned in your Physics textbook even though Ampere experimentally confirmed their existence in the last century.

The reason the Graneaus wrote *Newton Versus Einstein* was to present in layman's language a discussion of local contact theories (particles and whatnot interact with each other via energy-bearing fields, photon exchange, etc.) as opposed to Newtonian simultaneous-far-action-at-a-distance theories. All current "grand" physics theories are local contact theories. The Graneaus present the results of many experiments which they are certain *cannot* be explained in terms of local contact action, but can only be understood by positing the operation of simultaneous far-actions.

(At this point you might recall the discussion from the first section about the speed of the force of gravity. I e-mailed Van Flandern concerning the Graneau book, and he confessed that he had passed it up for reading after a brief inspection when he saw the authors were arguing for a return to simultaneous far-action. He has since reconsidered.)

The most interesting part of the

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Graneau book for me (they also spend lots of time with Mach's Principle and quantum mechanics) is where they discuss experiments that confirm that the Ampere theory of electrodynamic forces is the correct one. Briefly, the current view of Lorentz says the forces acting on current-carrying wires act on the moving charge carriers. This works marvelously well for free particles moving in, say, a particle accelerator. But when electrons are confined to a wire, you need a different force law, one in which the forces act on the current-carrying *wire*.

As I said, this claim is confirmed by many of the experiments discussed in the book. Returning to our pendulum, the buckling at the tips of the Pi-frame is caused by longitudinal Ampere forces, pushing on the frame from behind. According to the Graneaus, the pendulum experiment shows explicitly that, although the Lorentz approach gives the correct magnitude and direction of the force on the pendulum (not to be confused with our earlier energy discussion, please), it is misplaced in the circuit. Correctly placed Ampere forces (the pushing on the long legs) *are* present, and the interaction between the pendulum and the stationary part of the circuit *is* action at a distance across the arc-gaps between the metallic conductors.

There are *no* experiments known (and the Graneaus looked for a long time) that disprove Ampere's force law for current carrying wires. There *are* experiments explicitly disproving important aspects of accepted EM theory. The Graneaus have both performed them and documented those performed by others. Many *Analog* readers have the wherewithal to perform their own experiments and also disprove accepted theory. (At the end of this article, I'll suggest you get busy.)

I grant that the previous subject matter may have gone over the heads of some *Analog* readers, so now we'll take a gigantic swing to the softer sciences and consider the age of the Sphinx. The accepted view is that the Sphinx is about 4,500 years old, supposedly built by the Pharaoh Khafre along with the second largest pyramid at Giza around 2500 BC. The evidence attributing the Sphinx to this pharaoh is slight and circumstantial at best, but lacking any harder evidence the attribution was at least reasonable.

But we now have harder, physical evidence, and the Sphinx by the most conservative estimate could not have been built after 5000 to 7000 BC. (It actually has to have been built earlier than this—there simply isn't a civilization capable of carving the Sphinx to be found at the 5000 to 7000 BC level.) The Egyptological community refuses to accept this earlier date.

A number of decades ago an Egypt scholar named Schwaller de Lubicz noted that the weathering on the back of the Sphinx was clearly due to water and not wind, and Egypt having been a rather dry place for all of recorded history, he concluded that the Sphinx must have actually been constructed at an earlier time when the climate was wetter. This observation was ignored until "maverick" (that means no Ph.D.) archeologist John Anthony West, a great proponent of Schwaller, decided to investi-

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gate the validity of the claim. West had originally assumed that the water erosion was caused by flooding, but not being an expert in erosional geology, he did something that the Egyptologists had not—he found himself a genuine erosional geologist to do the investigation. This was Robert Schoch of Boston University, whose specialty is the weathering of soft rocks like the limestone of the Giza plateau. Schoch was originally skeptical of the claim, but agreed to study it anyway. In short order he determined that not only was the erosion on the back of the Sphinx and its surrounding enclosure caused by water, it was clearly caused by precipitation.

I'd better back up a bit and talk about the Sphinx. Its upper portions were carved from a single rock outcrop and the lower parts were carved only after huge blocks of stone were removed to make a sort of enclosure for it to rest in. Now and then you see photos that make it look like the Sphinx was assembled out of individual blocks of stone. These blocks are from later repair work, some of it going back thousands of years.

Erosional geology is a fairly hard science. You can measure how hard stone is, and climatological studies will tell you how much rain was falling in the past, and you can measure how deep the erosional channels are. The erosional damage was found on the back of the Sphinx and on the walls of the Sphinx enclosure and on the two "temples" located near the Sphinx (apparently constructed at least in part from the stone quarried out to make the enclosure). Such damage is not found on other monuments in the immediate area. According to Schoch, the erosional damage on the Sphinx is a textbook example of precipitation erosion, and the only way to get such damage to the extent observed is to have rain falling on the Sphinx for thousands of years, and at absolute minimum, the Sphinx needs to have been built no later than 5000 BC.

We know of no civilization that could have constructed it.

Wait—there's more.

An Egyptian engineer named Bauval noticed that, from the air, the three large pyramids at Giza, which are not in a line but slightly offset, resemble remarkably the three stars in the Belt of Orion. The ancient Egyptians worshipped the god Osiris and his constellation was that of Orion. Space precludes my going into detail about Bauval's methods. Suffice it to say they are straightforward. He was able to show that the builders of the pyramids and many other architectural works of ancient Egypt were trying to construct the heavens on Earth. It must be noted that in this scheme the Nile River represents the Milky Way, which looked then like it looks now on a clear dark night far away from city lights.

Here's the problem. The pyramids are supposed to have been built by the Fourth Dynasty pharaohs around 2500 BC. Bauval did find that "air shafts" proceeding from both the misnamed King's and Queen's chambers of the Great Pyramid did point to Orion's Belt and Sirius (another important star to the Egyptians) respectively at the time of the vernal equinox in

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the 2500 BC era. However, the entire complex of pyramids and other structures is not properly aligned with the Nile (in its representation of the Milky Way) for any time after 10,500 BC. Also, that great Lion, the Sphinx, faces due east. In 10,500 BC, at the time of the vernal equinox, the constellation just rising due east at dawn was Leo.

Thus, a reasonable construction date for the Sphinx can be placed through astronomical alignment data at around 10,500 BC, and this great date is supported by the precipitation erosion data.

Wait—there's more.

Analog's own Chris Dunn (check out the August 1984 science fact article) has shown that the granite sarcophagus inside the king's chamber of the Great Pyramid could not have been manufactured using the Bronze Age technology supposedly in use at the time. Dunn doesn't much care what the Establishment says about who built what and when. He simply looks at the materials and what was done to them, and using his own knowledge of manufacturing techniques figures out what minimum level of technology one would need to accomplish the manufacture of certain technologically sophisticated artifacts.

We have yet to uncover evidence for much of the technology needed to build the Great Pyramid. And the conventional view certainly doesn't explain how a culture supposedly at the dawn of civilization was able to construct the largest and most precisely executed building in all of recorded history until the modern era.

My information on these subjects comes from a host of sources. I've listed a few of them in the bibliography, but a good up-to-date treatment of these ideas is *The Message of the Sphinx* by Graham Hancock and Robert Bauval.

One of the criticisms of an ancient date for the construction of the Sphinx is, as I've said, that we know of no civilizations back then that could have made it. Where is the evidence for them? Isn't it quite well established that Civilization arose out of essentially the Stone Age around 4000 BC or so, primarily in the Middle East, but also in China and India?

Lately, the date of the arrival of Civilization has been getting pushed back more and more, though in Establishment eyes we're still a long way from 10,500 BC for anything. Still, could the accepted view be radically wrong, off not by thousands of years, but perhaps by hundreds of thousands?

"No!" comes that voice from the gallery again. "Yes!" I reply equally forcefully, and that brings me to the work of Dr. Virginia Steen-McIntyre, tephrochronologist.

Back in 1966, Dr. Steen-McIntyre was a young geologist whose doctoral work involved the dating of volcanic ash layers. Practically anything airborne that comes out of a volcano can be called "tephra," but each volcano has its own signature sort of ash, and it is relatively easy to find the evidence of past eruptions in various soil layers. The archeological site she and her geological colleagues were working was at a place called Huayatlaco in Mexico, and some tremendously ex-

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citing artifacts had turned up there—pictures carved into fossilized bone found nearby, and bones of extinct animals obviously butchered by humans and associated with advanced-style stone spear points found in place. What made them so exciting was that it was abundantly clear to the archaeologists who had discovered the artifacts that this site was extremely old, perhaps going back as far as 20, maybe even 30 thousand years Before Present.

Why was this date exciting? Because in 1966 it had been well established that modern *Homo sapiens sapiens*-type folks had certainly arrived in the new world by 11 or 12 thousand years BP, and it was felt by many that this was also their first time across the land bridge connecting Siberia with Alaska in those days. If the archeologists could prove via geological dating methods that the site was upwards of ten thousand years older than the supposed arrival date of man in the Americas, then several careers would be made.

To make a very long story short, Dr. Steen-McIntyre and her colleagues dated the site four different ways. There was no free carbon (charcoal, plant debris, etc.) and all the bones were permineralized (turned to stone), so radiocarbon dating was not possible. But they could, and did, use the uranium-series method on the butchered bones (two separate techniques). In addition, fission-track dating was applied to zircon crystals from two separate volcanic ash and pumice layers that overlie the bed containing the artifacts and bones. Age estimates for the site also came from Steen-McIntyre's own tephra-hydration dating methods for the two volcanic ash layers and from geologic field evidence. The result? They got an overlap in the dating that put the site back to over 250,000 years BP.

Several different, independent dating methods, including four radiometric dates. 250,000 years BP. In the conventional view, in that era *Homo sapiens sapiens* were still 200,000 years away from appearing in Europe, and 150,000 years away from evolving!

The archeologist in charge of the site refused to accept the date. It simply flew too much in the face of received wisdom. I wonder how many other times good data is thrown out for what are essentially "religious" reasons.

I will leave Dr. Steen-McIntyre's site now for the bulk of my information comes from her, and we're currently working on a biographical novella detailing her story, and expect to do an interview/fact article also. But I will add that as I write this, I'm looking at the September 28, 1996 issue of *Science News*. Seems some archeologists in Australia are now able to push the arrival of modern man into that continent back over 100,000 years.

So these are just a few of the paradigm shifty things out there, but I hope none of you either just take my word for the validity of these findings, or just scoff and walk away. The items I picked are well within the realm of independent investigation by many, perhaps most, *Analog* readers.

And writers, too, for I am certainly taking my own advice.

I just recently bought a new house

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and the first thing I built in the basement was a workshop/office/laboratory. Some of those experiments from the Graneau book are on the top of my to do list.

When I was a physics undergraduate, we used to get the occasional paper from some "nut," certain he'd overturned Relativity or built a perpetual motion machine. I used to just write these things off. But now it is all too easy to find paradigm shifty work being presented by men and women with honest doctorates and credentials beyond reasonable dispute. Such people have always been around, but getting published has always been a problem.

But now there is another way to get the word out. It's called the Internet. And e-mail is cheap and easy.

I encourage you readers out there to get busy. Take advantage of the bibliography at the end of this article and begin to educate yourselves in the science of the next century. It will be very much different from what you're used to.

Those of you so inclined can try to verify this work on your own. You don't need a doctorate. A little money, a work space, and Internet access will serve you very well.

Resources

Those who wish to pursue further investigations into the topics presented will find the following books, articles, magazines, organizations, and catalogs invaluable. All of the books contain references you'll also like to pursue.

Dark Matter, Missing Planets and New Comets, by Tom Van Flandern. North Atlantic Books, (1993). ISBN 1-55643-155-4

Meta Research Bulletin, Tom Van Flandern, ed. Available for $15/year at PO Box 15186, Chevy Chase, MD 20825-5186, or call 202-362-8279.

Newton Versus Einstein, by Peter Graneau and Neal Graneau. Carlton Press, Inc., (1992). ISBN 0-8062-4514-X

The Message of the Sphinx, by Graham Hancock and Robert Bauval. Crown Publishers, Inc., (1996). ISBN 0-517-70503-6

Archaeology, Sept./Oct. 1994 issue. This issue contains three articles about the Sphinx expressing the conventional view and debunking West and Schoch. The Jan./Feb. 1995 letters column contains Shoch's reply where he handily refutes his debunkers.

"Advanced Machining in Ancient Egypt?" by Christopher P. Dunn. *Analog*, August 1984. Also check out the April 1985 issue for a letter from L. Sprague de Camp and Dunn's spirited reply.

Forbidden Archeology, by Michael A. Cremo and Richard L. Thompson. Govardan Hill Publishing, (1993). ISBN 0-9635309-8-4 This is the best place to read about Dr. Steen-McIntyre's work in the context of other unconventional evidence.

The International Tesla Society, PO Box 5636, Colorado Springs, CO 80931. Phone 800-397-0137. Website http://www.tesla.org e-mail Internet: USA-tesla@USA.net The ITS catalog is a must for experimenters.

Lindsay's Technical Books, Lindsay

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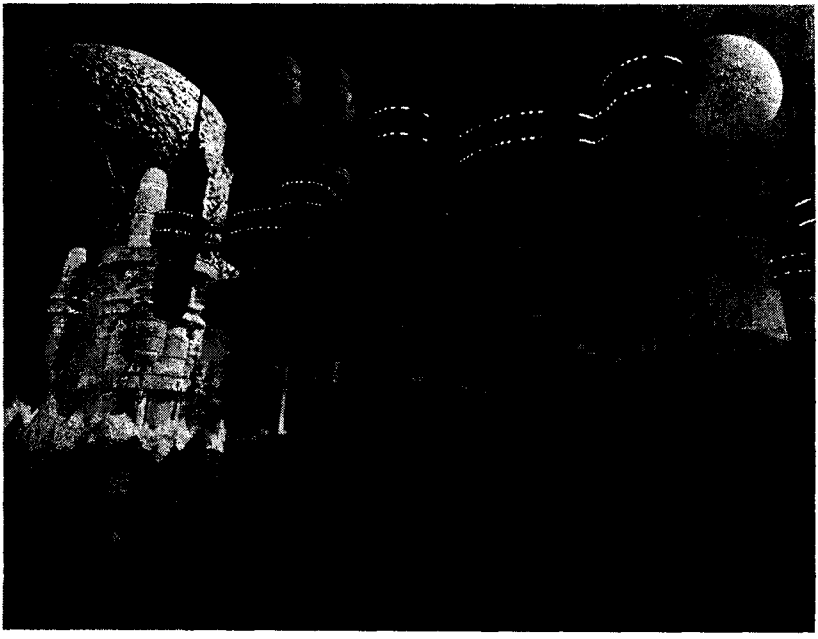
Publications, Inc. PO Box 538, Bradley, IL 60915-0538. Phone 815-935-5353. Great catalog for esoteric books about experimental techniques done on a budget.

Infinite Energy Magazine, Eugene F. Mallove, Sc.D., ed. PO Box 2816, Concord, NH 03302-2816. Phone 603-228-4516

Internet: 76570.2270@compuserve. com. $29.95/year for six issues. Your best source for news about cold fusion and weird (but well documented) science. ■

About the Author.

Apart from being a regular *Analog* author for most of the '90s, Jeffery D. Kooistra has also been a physics teacher, both at the secondary and college level. The study of science, both conventional and non, has been a lifelong pursuit. He has co-authored several papers on thermoelectric power measurements for several rare earth elements in the liquid state, but when the time came, chose to pursue the writing life rather than a doctorate in physics. He currently conducts experiments in his basement lab, but is looking for a suitable old castle.



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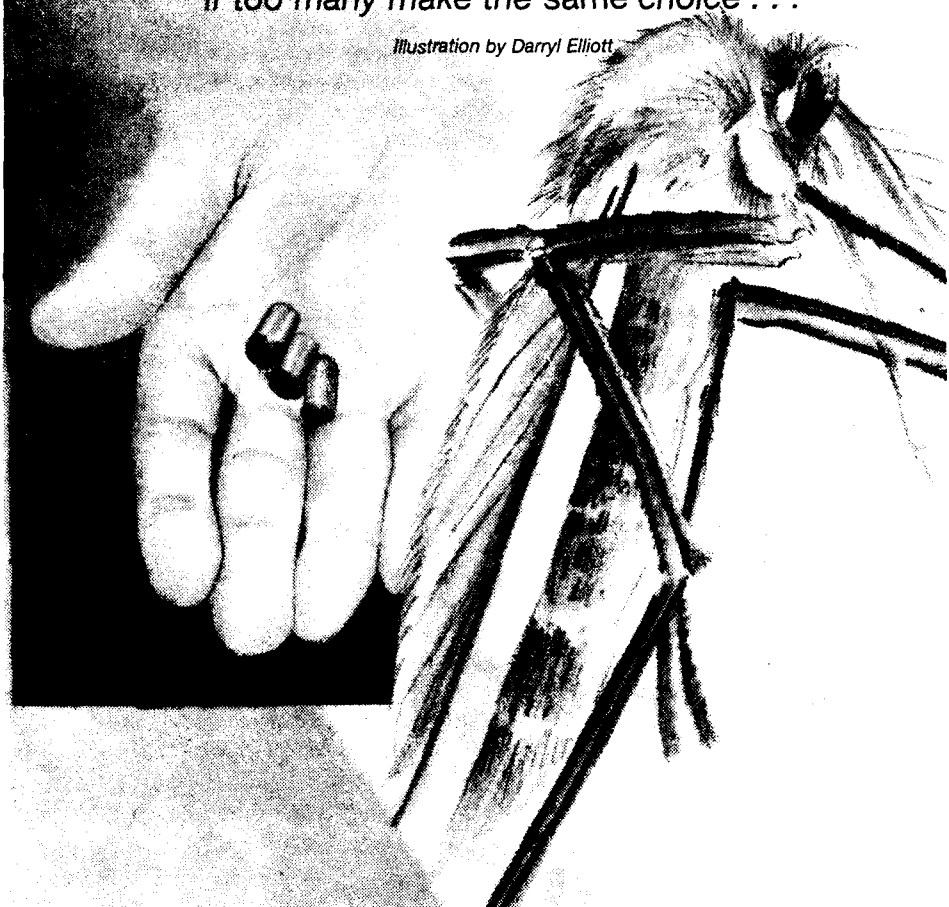
Mia Molvray

GENDER GAP

In principle, maximizing freedom of choice sounds like the highest of ideals. In practice, if too many make the same *choice . . .*

Illustration by Darryl Elliott



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Palanniappam Veenda bowed his head and tried to meditate as he walked to Siva Settlement. Instead he saw only a woman's face. His gentle, patient mother had steadfastly refused to leave her family for the Settlement, even after she had almost been kidnapped. But she had been the last. Since she had died three years ago, Pala had not been alone with a woman except in his dreams.

Sometimes, in one of his many moods of self-doubt, he worried about his unattractiveness. He had pleasing features that could have been designed by a sculptor, but his beauty was of a fine-boned sort not much admired in men, and he was rather thin and short. He was too intelligent, however, to really believe that lack of size or muscle made him uninteresting. He knew what the problem was. It was lack of money.

Dry grasses jostled in a faint breeze, as if they were elbowing each other to get to a place with rain and flowers. Pala raised his eyes and idly wondered why the breeze couldn't make itself useful in the stifling heat. The breeze finally brought him the smell of cooking fires near the stream where he could see beggars setting up camp. They were burning aromatic branches of neem and acacia, and anything else they could pick up. The overtones of burning garbage were not so pleasant. Pala sighed.

He walked by a temple and bowed like the good Brahmin priest he was, but his mind took no part in his body's respect. It only looked sarcastically at the *lingam*, symbolizing male creativity, which decorated the roof. Male creativity! What exactly had it created? A land without women. A land that was going to grow old and die.

Soon, with the familiar pit of nervousness in his stomach, Palanniappam Veenda rang the bell at the Settlement's massive outer gate. Once every three months his turn came around, and had been coming around for the last twelve years, always to no avail. However, he continued to inflict himself on the tea parties through a stern sense of duty since they were his only chance of ever finding a woman to share his life.

The huge Punjabi guard at the gate checked Pala's retinal scan against the records, even though he recognized him, and then let him through. One dog was ordered to escort him so that the other dogs would not attack. Abductions of women may have been a problem in the past, but Pala had no trouble seeing why they had stopped once the Settlements became customary.

At the door, the house matron greeted him and indicated the same door of the same lounge where he had participated in so many of these dreadful, stilted events.

"We are very happy you could join us, Shri Veenda," said the gentle voice of the aged chaperone. He bowed his head. "I would like to introduce you to a new member of our little circle," he looked up with too much interest, "Indira Tal."

She was a pretty young slip of a thing. She was also obviously bored with the old geezer being introduced to her. Pala dropped his thirty-year-old eyes back to the carpet. "So pleased

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to meet you," he mumbled, and moved off to help himself to some samosas on the sideboard. Figuring out what to do with your hands was always the most difficult thing at these events.

He busied himself staring at a school of bright blue and red fish, swimming around the aquarium at the center of the room, while he took small bites out of his samosa, and threw furtive glances around the room. It was not the first time the tragicomedy of his situation had struck him. Here he was, the man who lay awake nights consumed by longing for a kindly, understanding female to share his life. It was more than sex, much more. He had never had sex with a woman, and had long since discovered how to take the edge off that particular need by himself. Nor was he the sort of man who could find satisfaction with boys, as so many did these days. No, it was a woman he wanted, full of that indefinable, magical femaleness. It was a woman that he wanted until his soul hurt, yet he could not even talk to any of the specific women in this specific room.

"Pala, Pala, I keep telling you. You have to mix," said a quiet woman's voice next to him, her tone and her poke in his ribs making it clear that she was sharing an in-joke.

He turned and a smile lit up his face. "Saira! I'm so glad you came. I was already afraid you weren't going to be here today." Her large laughing black eyes answered his smile. She had an air of complete confidence Pala secretly admired. Standing arrow-straight in a glorious blue and gold sari, her black hair arranged in an elegant twist, she could have been a Maharani from days long past.

"Oh, Pala, I keep telling you, there's no point mixing with me. I can't marry you."

"Well, at least I can talk to you, which is more than I can do with anyone else." Maybe today he would finally ask her why she was always saying that.

"How is your respected father?" she inquired politely.

"Much the same. But something really wonderful has happened." He paused, enjoying the pleased anticipation in her eyes as she lent herself to sharing whatever he felt. "I just got an invitation to speak at the conference in Amsterdam!"

He pulled a fat envelope from his pocket. *Thirty-fifth World Religions Congress* it said on the envelope. "They accepted my paper." He pointed excitedly at the title, "Adaptations in Hinduism to the Realities of Gender Imbalance."

"How wonderful for you! I'm so glad!" Saira beamed with delight, making Pala feel that his own joy was finally real.

"Mainly I'm going to be discussing the changed position of women," he explained, talking quickly to keep himself from hugging her, "the destruction of the caste system, the ability to marry across castes. It's such a recent development, yet now we priests are all convinced that this is ancient and venerable tradition. A lot of my paper is about the cognitive psychology of rationalization." He smiled apologetically. "I thought I might bring you a copy, but then I

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thought it wouldn't be very interesting for a genetic engineer."

Saira laughed and swatted him. "Send it. Next time you come I'll tell you everything that's wrong with it. So when will you be going? Where exactly are they holding it?"

"Wrong with it?" he asked with some trepidation. "What do you mean, wrong with it?"

"Pala, Pala, I'm just *joking*. I'll bet you spend all your time on how women can marry anyone. What about how we can't live anywhere?"

He remembered a conversation decades ago with one of his most crotchety aunts.

"Are you angry with *me?*" he'd asked her timidly.

With a little puff of scorn and a shake of her head she'd said, "No, child, no. But how would you like to be born free, and end up caged inside your own house?"

Pala glanced toward Saira sorrowfully. "I never did decide whether you are freer being shut out or shut in."

For a moment Saira was silent, and then she said quietly, "That's what I like about you, Pala. You understand things." She continued in a more conversational tone, "Anyway, you still haven't told me: where and when?"

"Next month before the fall trimester starts. It's being held at the big Amsterdam Ko—" he looked at the envelope and spelled out slowly "Koninglijke Hotel."

"Next month?" she repeated as if calculating something. Then, more absently, "The old Koninglijke Paleis? That's a beautiful, seventeenth-century palace right in the center of the old town. I wandered through the public section for hours and hours."

"You've been there?" he asked with some surprise. "I thought you'd gone to university in England?" It was hard for him to say it blandly. He himself, like almost every other boy, had received the polite form letter. ". . . Due to repeated incidents involving male students from your country, we regret that our policy does not allow us to consider your otherwise excellent application. . . ." His brilliant academic record, his perfect behavior, the venerable Brahmins who wrote supporting letters for him, it all counted for nothing.

But he was letting his mind wander and was missing her answer.

"—Leeds. But of course on holiday I always went as far as my money would take me, and Amsterdam was one of my favorite cities."

There was a radiance to her smile and a fire to her enthusiasm Pala had not seen before, and it pained him to see how much she loved those distant, exotic lands when he wanted her heart to be here, in Ganjapur. Yet why should it be? There she could walk through splendid palaces at will, while here she lived surrounded by dogs.

"Why did you ever return?" he asked her in a small voice.

She leaned back with a quiet laugh. "There I am just one of many molecular biology Ph.D.s. Here I can become a millionaire just for being a woman."

He shrank as if someone had thrown ice water on him. Surely not Saira, too? It couldn't be!

She laughed again, a bit sadly. "Well, actually, it's more complicated

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than that, but that *is* the deciding reason. For myself, I might have stayed there, but I might also not have. This is my home, my family is here, and most important, life here is so full of dreams. Everything is brighter, bigger, more intense than the drab, bare facts of the Western world." She glanced at him appraisingly. "Take you, for instance. You have enough fire just sitting there, talking, to ignite ten Englishmen."

He blushed under his coffee-brown skin. In a world where they were both free, it would have been a compliment to dream about. But he lived in a world where he lay awake nights, and he wasn't so sure. "Lucky Englishmen," he said.

She threw her head back and laughed out loud. "Yes, well, I know what you mean," she said, still chuckling as she settled back down. "Anyway, be all that as it may, it was the successful marriage of my older female cousin that first lifted my family out of poverty. They were Harijan, you know. I am the only other marriageable female, and my family is very definite that they want me to make an advantageous match."

Palanniappam stared fixedly at the floor. He'd had no idea, even though he'd talked to her many times over the past four years. If her family had been Untouchables, and this was the first generation to taste prosperity, the pressure on her must be enormous.

"I don't understand," he said shaking his head. "There's Trivanastra who owns the cellular plant," he nodded toward a fellow standing by the samosa table with two women talking to him, "there's Saruddin of S&A Financial Services, there's Singh of Singh Agro." You had to be someone to be admitted to these teas at all. "Any of them would probably give you everything he had."

"Mmm," she said. "There's only one small problem. I don't mind waiting for money for my family's sake. But they have to wait for someone I like, for my sake. It appears to be very difficult to satisfy both requirements."

He looked at her sadly, and slowly shook his head. "Oh, Saira," was all he could say. "Oh, Saira, Saira." It suddenly occurred to him that she always came and talked to him when he was there.

"People here, people in so many countries, wanted nothing but boys," he was continuing softly, almost to himself. "We were desperate for boys. We got what we desired and we got disaster. Now only the rich have children, and who knows but that may be an even worse disaster—"

Saira meanwhile, stood up and beckoned. "I think I want you to see something," she said cryptically. He followed her as she headed toward her room. Discreetly, she pressed her commlink to request a chaperone, since entertaining a gentleman alone in her room would lead to endless speculation.

"Not a word of this to a soul, Pala. I'm getting the patents as we speak. Look," she leaned toward the computer screen with singleminded intensity, oblivious to the chaperone who slid quietly into an armchair by the door. The screen showed rows upon rows of red, blue, green, and yellow lines as meaningless as modern art to

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Pala's eyes. "Those two are identical! See that? Identical! The coding regions match perfectly, the introns are the same, even the tandem repeats—" She happened to glance at him and took pity on his blank stare.

"Remember when I found that sperm carrying an X chromosome have a different membrane protein from those with a Y? Well, I've designed two genes to make proteins that bond with the X- or Y-related membrane protein, *and* I've found a way to get that protein to embed itself in the vitelline layer!"

As always when his conversations with Saira got technical, Pala felt he was trying to read fine print off a speeding train. Luckily, this time he remembered the relevant facts she'd explained before. "So, since that outermost vitelline layer of the egg is the first one contacted by the sperm, you can choose which type of sperm binds with the egg?"

"Exactly," she crowed triumphantly. "End of gender-balance problem!"

Pala stared at the hieroglyphic screen with its tremendous message invisible to the uninitiated. Could it really be? Was he looking at the end of Settlements? Of men-only parties? Of streets without a single woman on them? Was this little screen showing a sudden lifting of the death sentence on his whole vast land—and so many others? He felt a lingering doubt that the calamity brought on by cheap and effective gender selection could be cured by more of the same poison. It was true that no one was mad keen on sons these days, but now—

"Saira, now they'll just have all daughters. If I were young enough to benefit, I might even feel it would be an improvement," he smiled slightly to show this was a joke, "but, really, Saira . . ."

"Not at all," she exclaimed, still alight with victory. "I've been following the work of Schuijvendaal on endangered mammal species. Do you realize just *one* regulatory gene is responsible for the size of litters?"

The train had just speeded up again, and the print had gotten smaller. He thought they were talking about gender selection?

"No, think about it, Pala," said Saira, mistaking his fogged expression for doubt. "It could be a package: one engineered gene promoting twins through double ovulation—which helps mitigate the population crash we're having with only 10 percent of the population female—and two others making these X and Y factors in equal amounts, so that children have to be born in gender-balanced proportions."

"Ah," he said. "I see," but before he could begin considering the implications, she ran on.

"There is a problem, however, and you can help me with it."

Pala leaned forward. Help Saira? Him? He felt foolishly delighted at the thought of being useful to her.

"To make enough copies of the genes for field trials—which I should get the OK for soon—I need ultrapure template. That way I can be sure that the copies are right. The only way to be sure of pure template is to use a microgravity environment like SpaceLab—"

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Pala blinked in surprise.

"Schuijvendaal has offered to take my sample up piggybacked on his, but he's booked on a flight early next month and I was just thinking there's no way I can get my samples to him by then. . . ."

It took Pala a second to figure out his role in a space flight, then he beamed. "I'll be delighted to carry your samples to Sch-, to Sh-, to the Dutch gentleman." He didn't even ask her why she didn't simply send the samples by courier, but in the next breath she answered his thought.

"I'm worried about Veerapatram."

That was the grand old man of the Indian Academy of Sciences, a proponent of uterine replicators as the solution to all their problems, and a ruthless critic of all other approaches. Saira had mentioned him before.

"It's not just bad reviews of my work anymore," she continued. "I'm almost certain he's been eavesdropping on my e-mail. Then there was that strange and frightening loss of samples at Singh's lab. I'm beginning to think old Veera will stop at nothing to remove any competition for funding. I'm certain if he could bribe a courier to get my samples, that'd be the end of it."

"You'd think his funding would dry up regardless, since he never actually gets results," puzzled Pala.

"Oh, he gets results. Every year he—well, his postdocs—solve another little problem. Transport of monosaccharides across the pseudoplacenta. Regulation of monosaccharide transport. Transport of gamma globulins across the pseudoplacenta; regulation of . . . and on and on and on. Kliunas once started to tally how many different molecules cross a placenta, and he stopped counting at ten thousand. At this rate in twenty thousand years, Veerapatram will actually be able to support an embryo." Saira would have snorted except she'd been brought up not to.

"You'd think hundreds of other scientists would be trying other tacks besides you."

"And sink their careers?" Saira asked with raised eyebrows. "That old goat *is* the IAS. They'd never get anything published, and they'd have to work without funding. The only reason I can function is my family, especially my cousin, channel money to me. They know I wouldn't last here very long if I had nothing to do. How many other scientists have that luxury?

"Now," she continued, looking at him seriously, "you be careful, and watch out for pickpockets. There's no reason for him to think you're my messenger, but be careful."

Pala left in a warm glow at Saira's trust in him.

Pala called for a minicab on the day of departure, more excited than a boy on his first elephant ride. He was disappointed when the company did not send around his family's usual driver, who would have enjoyed his elation. but that didn't stop Pala from beaming at every passerby from the open back seat of the little three-wheeler. As a priest, half the town knew him, and good wishes mingled with the cab's electric hum almost to the airport. There the cab driver turned

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down a bumpy dirt road.

"Ei!" Pala cried. "The *airport*."

The driver ignored him.

"Ei!" Pala cried louder and shook the driver's shoulder. The man shrugged him off and set the speed to maximum. The cab whined much more and went a little faster, Pala gesticulating wildly in the back. He was seriously frightened by now. Just a moment ago the world had been so familiar.

A farmer's pickup appeared bumping along in the other direction. It slowed. A young man with a mop of bushy hair leaned out the window.

"Good day, Shri Veenda! Is there a prob—?"

The minicab driver had to slow to avoid the interfering pickup on the narrow dirt road. Pala grabbed the chance to jump out.

"Desi, quick," he babbled, struggling with the pickup's passenger door, "quick, get me to the airport. And away from this demon driver!"

The minicab driver abandoned his mission and steered his cab away, whining its heart out.

Pala stared after it bewildered. It occurred to him he was lucky Veerapatram was just an amateur at this. Suddenly he was jolted back to the here and now by noticing that Desi was turning to follow the cab. Was it more important to follow one cab driver, who probably couldn't even be linked to Veerapatram, or to complete Saira's vastly important project?

"No, no," Pala commanded. "To the airport!" Desi was urging the need for police. "Forget the police. I have to get my flight!"

At the airport he asked Desi to stay with him. He might have imagined it, but he was sure a disappointed fellow shadowed the pair of them until he was actually boarding the plane. Pala sincerely hoped old Veera didn't have any henchmen in Holland. And what was he going to do once he got back? Demand a police escort? What plausible reason could he give, since he had no time now to fuss around with a police report?

The flight itself was uneventful, until Shri Palanniappam Veenda felt the wheels of the jet carrying him bounce on the runway of a grey, flat, misty country, dimly seen through the little window. The four-hour flight on the slow jet from Delhi had left him feeling tired and cramped. He had expected to be unable to contain his excitement at this point, but now all he really wanted was a bath.

However, his feelings started to change in the cavernous Customs hall, even before he walked out into the new world itself. There were women everywhere. Women fussing over baggage; women reading books as they waited in line; serious, uniformed women asking curt questions and marking bags as having passed inspection. One woman quickly moved away from him when she noticed him behind her in the line, but he was too busy staring around to give it any more thought until much later. For now he just goggled at the overwhelming result of people wanting daughters as well as sons.

Out in the throng of people meeting the plane, he saw a sign with his

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name on it floating above the crowd. Two people, not one, were standing under it: a large, black man with smiling eyes, and a little, white woman with a bold and confident air.

"Mr. Veenda?" the black man had spotted him. "Amenatave Mbalavu," he pointed to himself. "I am the Fijian representative for the Methodist delegation. Ms. Karen Springer, with the USA Unitarians."

They asked about his flight and said he must be tired, but Pala was suddenly wide awake as the cold air of northern Europe hit him when they stepped outside.

"Ai-ya," he breathed, "what a country!" Every pore in his body clamped shut, and even wrapping his arms around himself hardly helped. "I-I have a few warm things in-n m-my bag," he said, his teeth already chattering, pointing to the suitcase the Fijian was courteously carrying. He opened it, and pulled out a vest and a long cloth coat in the Nehru style.

The Fijian's ready smile showed what he thought of these completely inadequate garments. He took his coat off. "Here. I've had a few days to acclimatize, being an organizer. We brought a coat for you in the car, in case you didn't have one. No, no, no. Put it on. You'll get pneumonia otherwise. Come on, put it on."

"I know how it is," Mbalavu continued as they trekked across a vast parking lot. "It was thirty-eight degrees centigrade with 90 percent humidity when I left Suva. When I got off the ramjet it was like walking into a meat cooler at five degrees in my underwear. It was probably closer to twelve but—" He stopped and looked around. "Where is that miserable two-horse excuse for a car anyway?"

"That way," the American nodded toward their left.

Mbalavu just shrugged his shoulders, as if to say he was willing to take it on faith, headed in that direction, and continued to talk. "I'll tell you the real secret, though, to dealing with this climate. Long underwear."

"Ah, long? Long what?" asked Pala, just as they found the car. Gratefully he got out of the biting wind blowing cold, damp air through every chink in his clothes.

"You know, that's a very good idea," Springer joined in. "There's a C&A just a little bit out of our way."

A short while later, outfitted in his new thermal bodysuit, his Indian clothes blowing gracefully in the wind, Pala got back in the car feeling like a new man. It was amazing how much nicer the intricate houses and vibrantly green fields looked, now that he was no longer freezing. And the cold, damp breeze—why hadn't he noticed how good it smelled? There was no hint in it of dust or cooking fires; only rich earth and grass.

"There's a reception tonight at seven," Springer was saying. "And you're welcome to join us for dinner before that."

"You are very kind," Pala thanked her. His mind having thawed enough to start working, he suddenly remembered something. "Eh! You must be the Karen Springer who is in the same symposium with me?"

"That's right." Her face crinkled into a cute, apple-cheeked smile.

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"The one from the all-female family."

"An entirely female family . . ." Pala mused, boggling quietly to himself at the thought. "I wonder if it would be something like growing up in Siva?"

"Is that a Settlement? I'd love to talk to someone from there. But any single-sex upbringing must have common elements. Did you find that you idealized women? Which expectations did subsequent experience show were wrong?"

Pala shook his head dubiously. "I don't know. I haven't had any subsequent experience. And I didn't really grow up without women. My father's five older sisters were always around, and my mother lived with us." *It feels so long ago now*, thought Pala. "Anyway, I could easily give you the address of a woman who lives in Siva."

"That'd be wonderful," Karen Springer nodded happily, handing him her commlinker. As Pala tapped in Saira's address, he had the disorienting sensation of being in two places at once. One tap at the "send" instead of the "store" button, and he'd be talking to Saira as if he were back in the Settlement's drawing room, breathing the heavy air laden with smoke from cooking fires and the smell of old furniture dying in the heat. However, he didn't tap the "send" button, though for one wild moment he considered it. For an unattached male or female to send an unexpected communication to a member of the opposite sex amounted to a declaration of love. Pala doubted Saira would appreciate such pushiness on his part.

"On your left," Mbalavu was saying, "is the Rijksmuseum. You must visit it before you leave. Not far from here is also the Stedelijke, where they have a number of van Goghs." The car rattled about on cobblestone streets, its electric motor whining now and again as it climbed the steep but short incline of a bridge crossing a canal. "We're thinking of gathering for dinner at about five in the lobby, which gives you about three hours till then." Mbalavu stuck his head out the window and let out an earsplitting whistle for the bellboy as they rolled up to the hotel.

In a moment there was an answering whistle, only slightly less fearsome, and a diminutive bellboy strode up.

"Deze keer heb jij gewonnen, kleintje," said the little chap, pointing at the big Fijian towering over the car.

Mbalavu's teeth gleamed in a huge smile. "Ahh. I think he said I won that time." Then, looking a bit dubious, he added, "I also think he called me 'Tiny.'"

Taking only the time to wash and hang up his packed clothes, a scant hour later Pala was back out on the windy street, making his way to Schuijvendaal's lab in the Amsterdam Free University. Turning his map this way and that, he hurried down one of the smaller streets leading away from the square in front of the Palace, and soon came out on a canal lined with cobblestone streets, trees, and centuries-old houses. Pala peered surreptiously into the cozy interiors, with patterned carpets on the floor, lace antimacassars on the antique couches and armchairs, and plush rugs on the tables.

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Elaborate chandeliers were lit in some apartments even in the middle of the day, because the clouds were so thick. Pala wondered whether the Sun ever came out here.

The small streets were by no means crowded, but there was a steady stream of pedestrians, bicyclists, and the occasional car. Men and women went about their business, or traded greetings and conversation, or sat on benches along the canal enjoying the quiet melancholy of fall. There was a pervasive air of peace, and normality, and predictability that permeated this place. You did not turn the corner to find a homeless beggar talking to his god. There were no homeless beggars. Nor did you see guards at the gates of the walled compounds of the rich. The glass of these houses could be broken with a simple stone. Nor did you come upon the funeral of a man killed for his wife. There were plenty of wives.

Briefly, Pala felt the foreign life as if it were his own, as if he had grown up in it. He would not be likely to die alone; it would not even occur to him to worry about it. His life and his mind would not have to sidestep desires, and his meditations would be free of the burden he could never quite shake. He would be free to feel like he felt now, pleasantly enjoying the place and the people, with nothing particular on his mind. Like he felt, he thought to himself with a wry smile, after he got himself a suit of long underwear.

Once he found the building, finding a specific lab in it was almost as difficult. However, perseverance won out, and soon Pala was shaking hands with a large, pink, jovial scientist in a large labcoat, with bushy eyebrows and matching wispy hair ringing his bald head. Pala was again tripping over Dr. Sch—, Dr. Sk—, Dr. Sh—

Dr. Schuijvendaal was looking at Pala's card and saying, "Very pleased to meet you, Meneer Veenda," pronounced the Dutch way to rhyme with 'rain-da,' when he noticed his visitor's difficulty. Smiling he said, "Klaas is easier, I think."

Pala nodded and suggested "Pala." "You received Dr. Satnam's message?" How strange it felt to say her name so formally.

Saira's colleague nodded. "Everything is ready. Have you the vials. . . ?"

Pala took out three tiny clear plastic tubelets, half the size of his thumbnail, containing nothing visible. Saira had explained to him that the desiccated, stabilized DNA was in there, but he still found it hard to take on faith.

"Ahh," said Dr. Schuijvendaal looking at the tiny tubes in his palm, "so this is it. The end of an era." He dropped the tubes into wells and handed them to his lab tech for shipment to the launch site. He turned back to Pala. "And which vector will Dr. Satnam for the finished product use? Mosquitoes, I would imagine?"

Pala knew enough to guess that he was talking about how the engineered genes would be inoculated into people. He hadn't really thought about it. He'd just assumed it would be one of the usual methods: dermal patch, nasal spray, or injection.

"Mijn hemel, nee!" laughed Schui-

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jvendaal when Pala suggested this. "Then you would have to wait till people to their senses came. You have not the time for that, no?"

He had a point, but Pala was disturbed. Gender choice had to be taken away, yet he would not want to be the one to explain it to people suddenly deprived of it. Was this really what Saira was planning? Mosquitoes, fleas, gnats, horseflies—Saira could probably command them all with her magic. What, exactly, was he helping here?

He left the lab far more preoccupied than when he'd arrived, and he got lost on the way back.

With considerable concealed trepidation he approached the only person on the street, a woman. She gave him directions, but so briefly as to be almost rude, and he heard her muttering under her breath as she turned away. "Surround the lot with barbed wire until they're finally dead from their precious maleness. Can't even walk in my own country without being harassed."

She muttered it in English too, just to be sure he heard her.

Pala opened his mouth to protest that his motives were not at all ulterior, but she was already marching away and he gave up. He stared fixedly at the melancholy autumn trees, but he was no longer a tourist in an exotic place. He was an undesirable alien. He couldn't stop trying to prove to himself that he was nothing like the foreign woman's picture of him. "It's not as if I'm thinking of sex every time I see a woman," he thought as he deliberately concentrated on one of the many women on the busier street where he had come out. But it was no good. It was as if he had told himself not to think of pink elephants. Soon he could think of nothing else.

Matters only got worse at the reception. The Western fashions for evening wear tended to run toward body suits with strategic swirls. Only the young and fit usually wore them, but that did not make it easier for Pala. It took more and more effort to concentrate on what people were saying to him. It took more and more effort not to stare. His responses grew ever more disjointed, and he felt ever more conspicuous in his need. He finally went to sit on a couch by himself with a plateful of appetizers, to pretend he was eating.

"So," Karen Springer suddenly plopped down on the couch beside him, "how's it been going?"

"Ah, very well, thank you. Very well."

She looked at him narrowly. "I'd say you need to relax. What are you worried about anyway? I've heard several people comment how we could learn something from India with regard to gracious manners."

"You-you are very good." He swallowed some kind of appetizer with difficulty.

"Well, then, relax," she commanded him confidently.

"I-ah-would not like to damage India's current good reputation by relaxing," he managed to say.

She eyed him narrowly again as understanding gradually dawned. "I see." She paused. "Well, even as to that, I don't think you'd have much to worry about. Not only do you have

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charming manners, but you're exotic. And handsome," she added as an afterthought. "I bet three out of four unattached women in this room would be quite curious to give you a try."

He stared at her, speechless. He completely forgot to chew his last bite of appetizer. He did not begin to recognize himself in her description. He couldn't believe anyone, certainly not a woman, could calmly sit there saying such things. And the notion that anyone could give anyone "a try." . . . He sat there, dumbfounded.

"Oh, go on," she laughed at him, "don't even try to tell me you never thought of it."

He blinked and gulped and started chewing again. He wasn't sure he liked her ability to share these particular feelings of his. "Um," he finally said. "Thinking is one thing. I would never say anything. Probably not even to myself."

"Well, it's been said. So go for it."

There was a directness about her, a matter-of-factness that was appalling. How did she expect him, after thirty years, to race off and pick up some woman? So many thoughts, so many longings, so many wakeful nights couldn't simply be wrapped up in an offhand, "Well, I'll see you upstairs then, shall I?"

Slowly, he shook his head, staring at the floor. "I come from a more dream-heavy land," he murmured to himself.

His symposium was on the morning of the fifth day. The months he'd spent preparing paid off wonderfully, the discussion following the talks, including his, was animated, and before he knew it he'd been corralled into having lunch with the chairman of the philosophy department at a large Canadian university, discussing the ethics of selection. (*And of anti-selection,* thought Pala heavily. Soon he would have to discuss it with Saira.) The lunch stretched out over three hours, and Pala missed most of the afternoon talks. Shaving hurriedly before dinner, he checked his commlinker as an afterthought. There was a message.

"Identify," he spoke at the machine lying next to the washbasin.

"Saira Satnam, Ganjapur, India, 555-10-357-"

His heart skipped a beat. "Stop," he cut the machine off. Saira . . . sending him a message. . . . Why. . . ?

"Read text," he ordered the commlinker.

"Pala, just a short note to say that I hope your talk this morning went well. My cousin and her family came for a visit. Have I ever mentioned what conceited, helpless, silly asses rich children can be? All the best. Saira."

He sat down heavily on the edge of the bathtub, half his face still unshaved. A strange, wild joy shot through him that he scarcely dared to let himself feel. She had sent him an unexpected message. Just like that. His heart didn't seem to care if she took justice in her own hands. It was then he realized how much he loved her.

Suddenly he leaped up and finished dressing for dinner in a frenzy of activity. It was impossible to contain his excitement. He wanted to run and jump and shout. He vaulted over the bed to get his dhoti, and laughed out

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loud. He made a valiant effort to settle down.

He e-mailed back, "Dearest Saira. Overjoyed that you agree. However, we need to talk as soon as I return. About—"

He stopped himself just in time. If Veerapatram really was monitoring her mail, it wouldn't do to tip him off. He sent the message without any explanatory sentence.

The air of Ganjapur enveloped him like a warm blanket on a summer day. How could he have forgotten the heat here so quickly?

Looking about rapidly, he didn't see anyone suspicious-looking, but neither did he see the three family servants he'd asked to meet him. Someone bumped into him, someone he hadn't even noticed, and gave a sharp tug on his cabin bag. He whirled, clutching it more tightly than ever. What would have happened next if he'd remained unaccompanied, Pala did not like to think, but suddenly the huge Punjabi guard from Siva appeared, towering over the lesser men scurrying around below.

"Ji Satnam hoped it might be convenient for you to come directly to Siva," he murmured, bowing as he approached.

Pala stared about wildly, but the would-be robber had vanished. Pala's breathing gradually returned to normal.

Pulling up at the Settlement, for once without dread, Pala was glad but surprised to see Saira waiting at the door. There wasn't a chaperone in sight. She had clearly made her mind up, money or no money. However, they hadn't actually said anything, and he didn't quite know how to say hello to her. In the time it took him to get out of the car he decided that if she was bold enough to stand at the door and wait for him, he could be bold enough hug her. She seemed surprised and pleased at that.

He was wondering when his arms and chest would stop tingling.

Pulling him along she said, "So, you want to discuss involuntary gender balance, I suppose?"

"Uh, yes," he said, feeling inexpressibly relieved that she understood the problem.

"Well, Pala, I'm afraid my feeling is that a disaster has been created through stupidity and prejudice, and that waiting to do anything about it until people are less stupid is just asking for more. We can't afford any more."

"Are you going to tell them that when they want an explanation?"

"Gladly," she said. She looked eager to start.

"No, Saira, listen. You're taking a choice away from people. The end does not justify the means."

"Pala, if the gender-balance problem isn't fixed, and soon, there won't be anyone around to appreciate your ethical restraint," said Saira, kindly but firmly, as they reached a little shed apparently made of screens, inside and out. When they stepped inside, Pala saw why. It was an insectary, quite a large one.

"As soon as I get the regulatory approval—which should be quite soon now because all the simulations have checked out and the process has been

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fast-tracked—I'll get my gene copies into these beasties, and away they go." Saira smiled happily, and her army of mosquitoes sang back in their thin, high whine.

More and more of them landed on the screens enclosing the internal passage, smelling the blood in their midst. Pala frowned at the thought that in a very few days, their bites could be changing his life. And what was next? After Saira did this for a good cause, would someone else, the government, the criminals, do it for a bad one?

"Won't Veerapatram try to block it?" he suddenly objected.

"He's already tried. The simulations show the genes to be safe though, and the government certainly doesn't want to be accused of stonewalling on this one!" She took another look around her insectary. "So, aren't you impressed with this?" She waved her hand to take in the thousands of healthy insects.

Pala shook his head sadly. "Saira, you always get ten times more done in half the time than anyone else. I'm always impressed. But what are you doing?" He looked straight into her eyes, and did not look away.

A shade of doubt crossed her face, and she dropped her gaze. "I thought I was trying to help save the world. Why? You have a better idea?"

He smiled slightly at this. No, he shook his head. "I would just like to avoid the path where everyone with a good idea feels they can alter anyone's genes."

She looked startled, as if it hadn't occurred to her that genetic alteration might proceed beyond her attempt to save the world.

Pala unzipped his cabin bag and pulled out the box containing her hard-won, ultrapure template. "This," he spoke softly, "is yours. I would not keep it from you, and what you are doing *is* in the best of causes. But, if not for your own sake then for mine, think about how you might use it more fairly."

She looked at him, her eyes wide with sorrow, and now filled with doubt. "Oh Pala," was all she said at first, sitting down heavily on a bench. "I don't know how else to use it. Effectively, at least. We may as well not use it at all. Wait for the uterine replicators, like everyone else."

She was so truly miserable, Pala felt like crying himself. "Saira, no, I didn't mean . . ." He was so distressed for her he sat next to her and put his arm around her shoulders to comfort her. She didn't move away. "You're not supposed to give up, Saira. You're the one who does the impossible. You're supposed to figure a way out."

However, she just sat there, leaning into him slightly, hunched as if she were cold. "There's no way," she muttered. "To be effective it has to be universal. Give people a choice, and they'll dither and procrastinate, even if it's an idea they approve of. Like organ donation."

"Well, so you can't give them a choice at the front end, give them a choice at the other end," Pala said suddenly. Saira looked up, not sure of his meaning. "Don't engineered genes all have to be destructible, for safety reasons?"

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"Yes, but normally they only lose effectiveness after ten or fifteen years. There won't be much point having one that only works for a few weeks."

"No, no, that's not what I mean. Don't you have to show the ability to turn them off, in case there's a problem?"

"Yes. Mine get turned off by a sudden spike of galactose to the system."

"Well, then. Provide free gala-whatever to people who want it. You've reintroduced choice, but now people have to do something to activate it, so if they dither and procrastinate, it'll help the cause!"

The limpness went out of Saira's body and the look in her eyes was one of calculation. "It just could work. It'd be very expensive, of course. I'll be getting royalties for agricultural applications of my genes, which would probably be enough to begin with, but soon it would have to be government money."

"I could help," Pala broke in. "My father knows half the politicians anyway."

"And we wouldn't want too many people actually choosing the antidote. . . ."

"I'll spend my time marching around the country," Pala said, smiling and earnest, both at once, "convincing people that the one true path is *not* to select genders. It's the one thing I'm good at," he said, taking both her hands in his, "talking about right and wrong."

"Not just talking," said Saira quietly. ■

We are all tolerant enough of those who do not agree with us, provided they are sufficiently miserable.

—David Grayson

When great changes occur in history, when great principles are involved, as a rule the majority is wrong.

—Eugene V. Debs

Breakdown and breakthrough can be the same process seen from different angles.

—Uncle River

The world has narrowed to a neighborhood before it has broadened to brotherhood.

—Lyndon B. Johnson

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THE X-33 DECISION, PART 2

In the weeks following the NASA selection of the Lockheed-Martin Skunk Works to build the X-33 on July 2, 1996, some information became available about it and the proposed follow-on operational Reusable Launch Vehicle (RLV), the VentureStar™.

The X-33 is planned as a half-scale prototype of the VentureStar, which is interesting because an X-vehicle isn't supposed to be a prototype. A triangular-shaped vehicle 67 feet long with a 68-foot wingspan, it's a "lifting body." In the 1960s, NASA flew several piloted lifting bodies such as the M2F2 and the HL-10. The Lockheed-Martin X-33 apparently revives some of this technology. It will take off vertically weighing 273,000 pounds, powered by a two-unit 400,000-pound-thrust Rocketdyne linear aerospike rocket engine that was originally tested and put back on the shelf in 1971. The X-33 is expected to reach speeds as high as Mach 15. It will make a dead-stick horizontal landing, steered by various aerodynamic control surfaces.

It also has a payload bay 5 feet by ten feet in size, being the first X-ship designed to carry a payload. (Why?)

Flight testing is supposed to begin from Edwards Air Force Base in March 1999. The X-33 will make about a dozen flights. The longest flights will go from Edwards to Malmstrom Air Force Base in Montana.

The Lockheed X-33 isn't a self-controlled "smart rocket" like the DC-X, but an unmanned vehicle operated by constant radio control from ground stations along the flight path.

After each flight, the X-33 will be returned to Edwards AFB atop the NASA 747 shuttle carrier aircraft, just like the space shuttle Orbiter is ferried from Edwards to the Cape.

Lockheed-Martin confidently expects to build the follow-on VentureStar that will be 127 feet long with a 128-foot wingspan weighing 2,186,000 pounds at launch, with a linear aerospike rocket engine producing 3,010,000 pounds of thrust. The planned payload weight grew from 40,000 pounds in late 1995 to 59,000 pounds in the contract award press kit, a whopping 47.5% increase.

Seeing these performance characteristics and numbers, plus the VTOHL operational mode, caused the author to look again at the space shuttle. No wonder Lockheed-Martin and

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NASA talk about VentureStar as a replacement for the space shuttle! It certainly looks like Shuttle II or "Son of Shuttle" with much the same payload capacity and almost identical operational mode.

Some SSTO advocates wondered how Lockheed-Martin would build this vehicle with such a complex shape and maintain the initial 0.9 propellant fraction. The complex structure uses "conformal tanks" that are both the structural members and retain the vehicle's aerodynamic shape. This is a formidable design task. No other aircraft or spaceship design has used such complex conformal tank shapes.

A further question is being asked: Why would NASA opt for a proposal that increases technical risks when simpler solutions are available? The answer seems straightforward to anyone aware of NASA's historical tendency to favor maximum new technology in any project. Administrator Goldin clearly told everyone, "Give me your best shot!" To the NASA troops and the aerospace contractors, this has always meant the shot with the highest and glitziest new technology. The laboratory shelves are stuffed with neglected technology whose only drawback was its perceived simplicity. The way the Delta Clipper DC-X was built with such little money in such a short time, with a high success record, is ample proof of this.

NASA states that "the X-33 must contain an immense amount of new technology." Why? The original objective was to use a minimum of new technology needed to demonstrate reusable SSTO operations. Find out what can be done with what we've got. Build a little, fly a lot using a dozen people in greasy coveralls to achieve one-day turnaround, not thousands of people in white lab coats with clipboards. Make it perfect later; make it fly now.

Some of the items NASA stresses as reasons why the Lockheed X-33 was selected don't seem to make sense.

With regard to engine gimballing, there is a severe lack of data on the response time for thrust-vectoring aerospike rocket engines at other than sea-level conditions on a test stand. Lack of this data makes it somewhat difficult to write flight control program software, especially in the transsonic and supersonic regimes. Sub-scale tests of a scale model X-33 atop a NASA SR-71 were originally scheduled for spring 1996. As of late 1996, these tests had not been made and an additional five-month delay is planned.

And more than one hundred days after contract, Lockheed-Martin and NASA have not published specific budget and schedule milestones to say nothing of a production and flight test schedule. One hundred days after McDonnell Douglas got the contract for the DC-X, I attended the kickoff meeting where the design had been completed and they were starting to bend tin.

For some reason, the Lockheed-Martin X-33 design itself appears to be vaporware. A hundred days after contract, Lockheed-Martin was still hiring engineers for its design team.

That's the technical side of the equation. What about the "economic" or "business" side?

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NASA intends to put more than $900 million into the X-33 program over the next three years.

The Lockheed-Martin proposal included a $220 million corporate contribution that's a mixture of cash, in-kind use of existing company resources, and IR&D ("Internal R&D") money that includes general-purpose federal corporate technology base subsidies and contributions from various subcontractors. Apparently, the move that won the contract was a "pledge" by Lockheed-Martin to put up $2 billion to build the VentureStar in the year 2000 and beyond. Apparently, Lockheed-Martin committed more of their corporate resources than either McDonnell Douglas or Rockwell.

Lockheed-Martin apparently believes it will be in a strong cash-rich condition by the end of this decade. It also plans to raise more cash through short-term loans because it already has a secure market position. It builds and operates the Titan and Atlas expendable launch vehicles with payload capabilities in the same range as the VentureStar, as well as being a partner with Rockwell in the newly commercialized space shuttle operations. This has already caused some observers to wonder why Lockheed-Martin would build its own competition. Others believe it was a move to head off the competition by monopolizing the business. The real skeptics believe that Lockheed-Martin can't build and fly the X-33 at all, that they'll delay the program, and that they'll finally announce they've proved SSTO can't be done at all, thus putting away forever any challenge to the existing space transportation status quo. Furthermore, if Lockheed-Martin fails in the X-33 effort, it can recoup any losses with a few Titan, Atlas, or shuttle flights.

The Lockheed-Martin economic analysis includes a linear market study based on known satellite launch requirements, leading them to believe that a fleet of three VentureStars will handle the foreseeable space launch market. These would be launched and recovered at the Cape every two weeks. The payload size was determined by NASA's requirements to launch about nineteen large space station modules. In April 1996 when I asked David M. Urey if Lockheed—who anticipates both building and operating the VentureStars—would fly with smaller payloads, he said yes, but didn't say whether the full flight cost would be charged.

The other potential market for large, heavy satellites will likely disappear as well. The huge 20-ton spy satellites of the National Reconnaissance Office will probably be downsized to a larger number of cheaper 5-ton satellites. The 59,000-pound payload capability of VentureStar might go largely unused except for less than two dozen NASA space station loads.

In late 1995, Urey told me that Lockheed-Martin would not build the VentureStar unless it received an ironclad agreement from the federal government to launch all government payloads plus an anchor tenancy agreement to supply the space station. This included liquidated dam-

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ages for payload cancellations.

The Lockheed-Martin proposal included a deal offering NASA eight shuttle replacement flights over a two-year period at a price of $250 million to $300 million per flight, about two-thirds to a quarter of the cost of a shuttle flight (depending on whose numbers are used). Commercially, it plans to fly 20 flights per year out of the Cape at a price of $10 million to $15 million per flight to cover fully amortized costs per flight of $6 million.

The Lockheed-Martin plan depends upon a 90% capture of the existing market. This is effectively a monopoly supported by NASA. It's likely to change over the next few years.

After the Lockheed X-33 selection, many of the vertical lander proponents felt it would be wasteful to throw away six years of accumulated knowledge and testing with the DC-X. The United States Air Force also publicly indicated an interest in the VTOVL SSTO by the attendance of General Malcolm Ward and his staff from USAF Space Command at the first public DC-XA flight. USAF likes VTOVL because they can put their money into vehicles instead of extensive ground facilities and then operate nearly anywhere.

A joint USAF/NASA low-key parallel project would not cost a great deal of money. For example, the DC-XB could be built using new tankage, a stretched aeroshell (to make it a little bigger), thermal protection system, and a fifth center engine. It could fly to Mach 3 in the summer of 1998 at a cost of $70 million for the Air Force and $10 million for NASA. The ultimate "stretch" would be the DC-XC with new conformal tanks, improved TPS, lighter structures, and upgraded engines. It would fly to Mach 10 in 1999 at a cost of about $130 million for the Air Force with the NASA cost dependent upon the desired NASA advanced technology tests.

A competition like this might be a good thing for NASA, for the Air Force, and for the country. Here's why. Keep in mind that the Lockheed-Martin X-33 is a relatively high-risk/high-payoff approach, bundling a number of new technologies into a complex and sophisticated package. If it works, it's a great spaceship to replace the space shuttle. But a lot of things have to come together all at once at the end of a very tight schedule. The DC-XB/C would complement the X-33 in terms of technology and institutional approach, exploring many known and promising RLV technical alternatives outside of the scope of the Lockheed-Martin X-33 approach. It's a hedge to the high-stakes X-33 bet. While the X-33 will pioneer the use of complex multi-lobe composite propellant tanks, DC-XB/C could provide insurance against manufacturing and durability problems by using much simpler tankage geometry. And the X-33 would be oriented toward fixed operating bases with specialized ground handling equipment whereas the DC-XB/C would be aimed at operations out of small, austere sites.

NASA's top leadership endorses competing X-vehicles but has a bad budget situation.

Given the promise of commercial

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space as discussed in several of my articles and in *Halfway To Anywhere*, it doesn't seem wise or prudent from a business standpoint not to have Plan B. Therefore, a lot of things could change in the next few years.

One thing for certain: following the path to the future will require the flexibility to make the twists and turns. That makes the trip interesting!

I was once asked if low-cost, affordable, reliable, on-schedule, commercial space transportation for everyone is a vision or a mirage. There's only one way to find out: keep walking toward it. ■

There is no country with a military so powerful, an economy so strong, and a culture so great that its politicians cannot pull it down.

—Dr. Donald Gilbert Carpenter

They are ill discoverers that think there is no land, when they see nothing but sea.

—Francis Bacon

If all economists were laid end to end, they would not reach a conclusion.

—George Bernard Shaw

As turning the logs will make a dull fire burn, so change of studies a dull brain.

—Henry Wadsworth Longfellow

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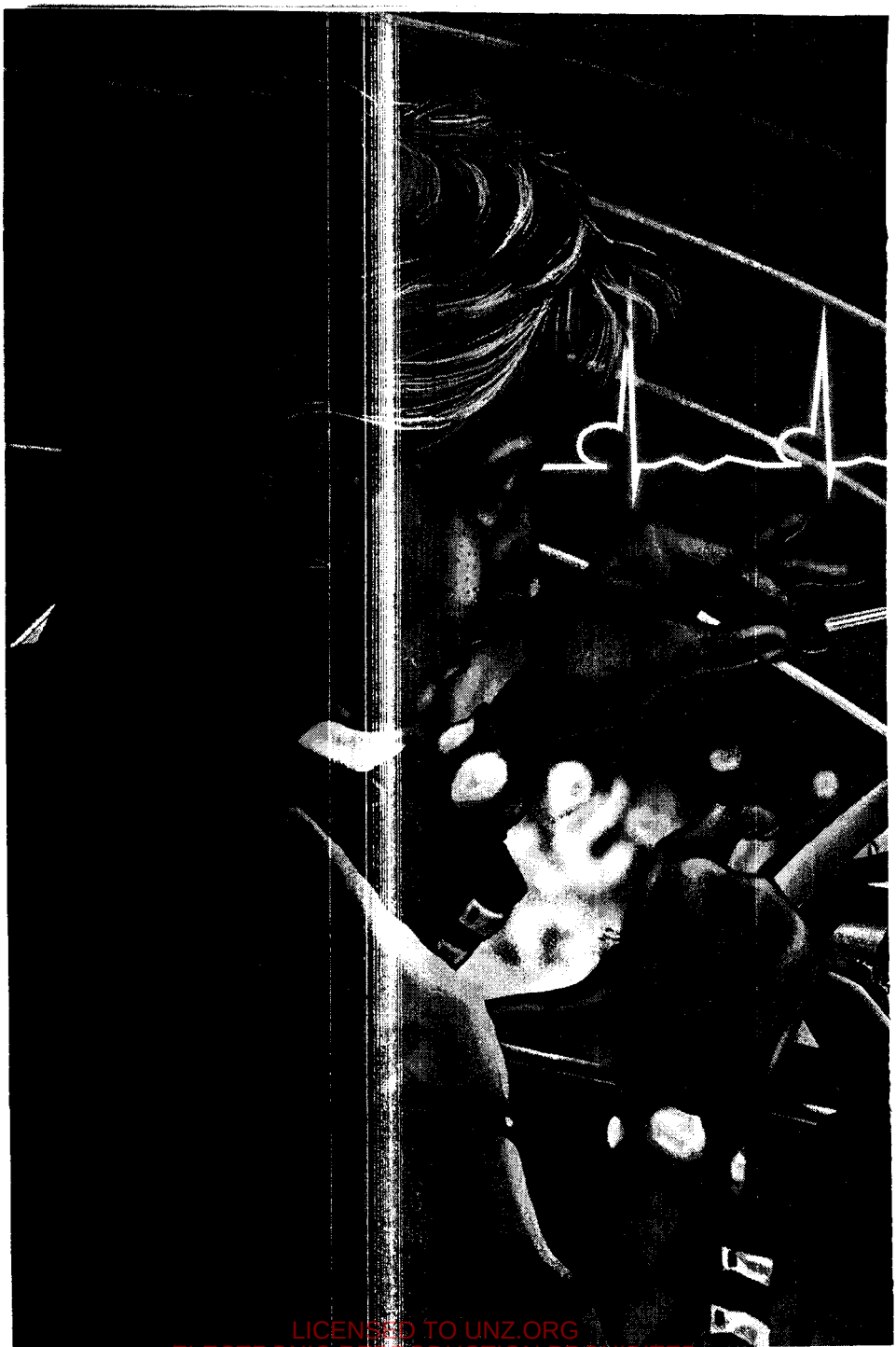

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Laurence M. Janifer

THE DEAD BEAT

Devious minds, not surprisingly, work in devious ways. . . .

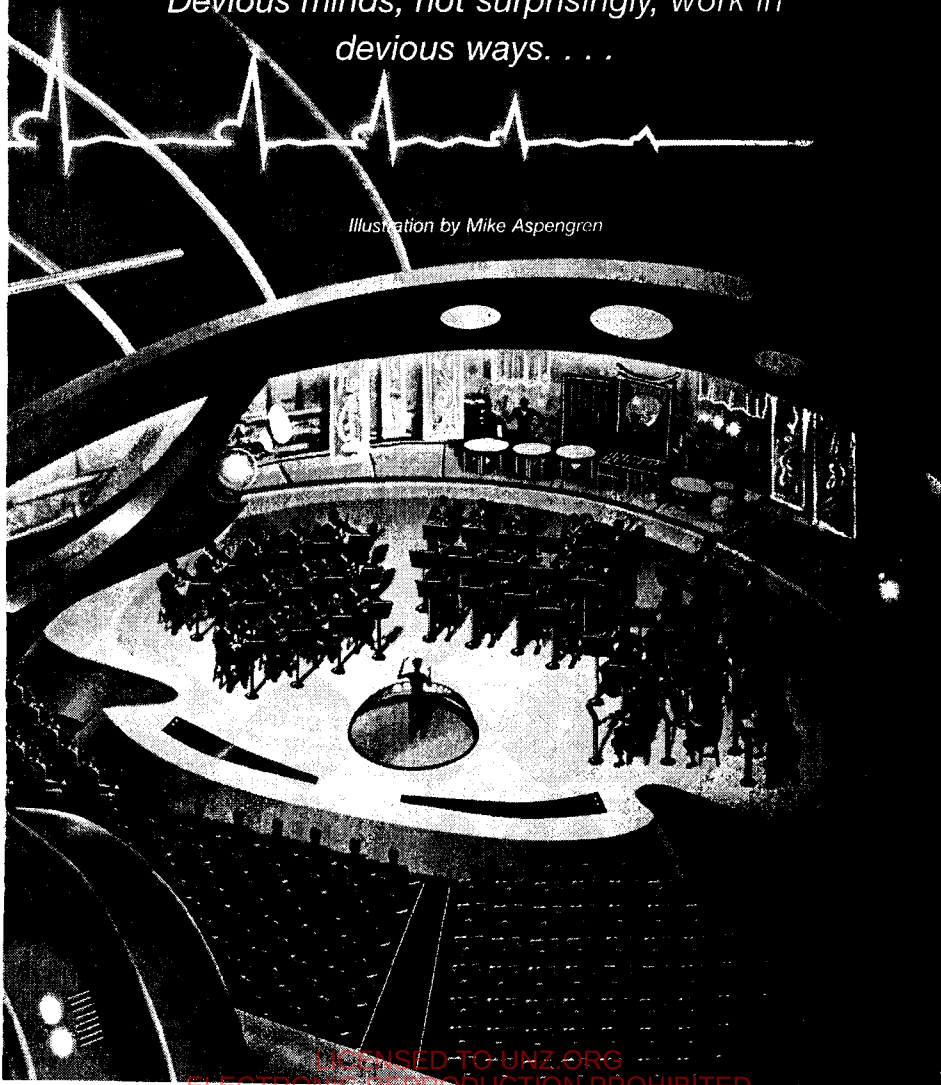

Illustration by Mike Aspengren

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Music (there are still people who say this, for God's sake) *is the universal language*—which is nonsense. Don't misunderstand me; I like music, of several sorts, from classical to the peculiar ninth-tone bass chants you'll hear on Alphacent. But even preSpace, anybody who quoted that silly saying should've been sentenced to alternating days of German, Syrian, and Thai concerts for a year. Not that you can't like them all, though I know no one who does (I know several who pretend, but why burst bubbles?)—but the musics are as different as the languages used to be. I speak as an expert on the subject, all of a sudden, having recently spent some time on Apelles, where there are concerts of all persuasions—as well as art exhibits, network publishers and readings, dance recitals, comweb share groups, and you name it—every day of every eight-day week, all the year round as, I think, the Christmas annuals used to say.

The *almost*-universal language, among human beings, is something Marietta Jink (who is a musician, and a fine one) knows all about. It uses music often as a background, sometimes as a stimulus, and at least once as a food (one of the *and Cleopatras,* my scrappy classical training tells me, though whether Shakespeare's *Antony* or Shaw's *Caesar* I can't be sure), and it is known as love, or romance, or (by the very learned in preSpace scientific junk) animal magnetism.

Marietta Jink has just about all the animal magnetism possible to a human female, as far as most human males are concerned. She had once turned it on me during a previous stopover on Apelles, relaxing in the Apelles Hotel Dome, when she had been struggling with a problem of orchestra finance (she's conductor of the Williamson Philharmonic, and she is as accomplished as her orchestra, something which is not true of all conductors).

I'd solved her problem for her very well and very neatly, if you don't mind the momentary preen, and when she got in touch with me again and asked me to revisit my glimpses of Apelles and see if I could provide a little more aid, I was pleased, but not entirely surprised. Some people seem born to trouble ("as the sparks fly upward," the bible says, and if sparks are flying upward around you, you are probably in trouble at that), and Marietta Jink, though she is one of my favorite rosebuds, had always seemed to me to be one of them.

This time, it turned out when I arrived, subscribers to the Williamson season were dying out.

Well, you may be saying, lots of season subscribers are elderly people, and elderly people do have this habit of dying out quite a lot; it's how they stop being elderly. But the fatalities seemed to be in all age groups, with a noticeable statistical preference for longer-time subscribers; someone who'd been attending Williamson Philharmonic concerts for five years, even though he was, say, twenty-seven, was more likely to have keeled over than someone of seventy-five who'd just bought his first season subscription. (Or her first season subscription, of course, but if I have to

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mind my pronouns all that carefully I'll have to add in anything up to seven non-human sexes as well—my audience for these reports is small but uncommonly varied—and things will get confusing for no good reason. Let's stick to Standard English, such as it is, and keep this as simple as we can—which is, I'm afraid, not very.) And the numbers were startling: about 11 percent of last season's subscribers were now gone. It was the sort of death rate you expect of an infantry battalion.

The word hadn't got out, as far as Marietta knew—it's not quite the sort of thing your average reporter, print, net or 3V, is going to happen upon very easily—but she was terrified that it was *going* to get out, and ruin the Williamson for good; people won't take to buying concert subscriptions at the risk of death.

There were, more importantly, all these fatalities. Marietta was sure coincidence wasn't at work—and though coincidences do happen, even more often than we like to think, I tended to agree with her, once I got a look at the details—and she wanted to stop whatever was causing the deaths before any more people got killed. Maybe it was something the orchestra was doing, or something the hall was emitting, and therefore something Marietta could put a stop to.

But she couldn't imagine what, and neither could I. Sitting in a concert hall on Apelles is not normally considered dangerous to your health, and nobody was lying in wait outside Petrarch Hall to bash people over the head with trombones.

The causes of death, in fact, varied—that was the first thing I asked about, of course—but nearly all were fairly common natural causes: stroke, aneurysm, heart attack. The remainder were scattered all over the map, everything from kidney failure to simple murder. (Apelles has a comparatively low murder rate, but "comparatively" is the word; the inhabitants may be fine artists, but they're still human beings.) Those scattered deaths looked like the normal curve, so to speak. The immense number of deaths from heart trouble, stroke or aneurysm looked (mostly) like the inexplicable bulge.

"Somebody," I said, "is playing hob with your audience's circulatory systems."

"And we haven't programmed the *Ride of the Valkyries* in five years."

We were sitting in the Apelles Hotel Dome (not a great many people even know about Apelles, which is basically an arts colony at the hell of a high level, and I'd just as soon keep it that way; it's a wonderful place to spend a few weeks, and I hate crowds), drinking remarkably good coffee and trying to make sense out of a large pile of computer printout; the hotel is a bit old-fashioned, and we were actually working from real (well, glare-treated) paper.

The coffee was labeled Sumatra Mandheling, which I doubt, but it was at least a remarkable imitation of one of the best of all coffees. (It's available on most of the Home Worlds, just by the way, and is worth looking up.) But at the time, I don't

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think I even finished two cups; the statistics kept jumping up and biting me, which is bad for the digestion.

"Is it only subscribers," I said, "or are casual audience members dropping like flies, too?"

Marietta shook her head. "I don't know how you could tell," she said, "without making a public announcement of some sort—will anybody whose friend or relative attended a Williamson Orchestra concert and died, within the past five years, please get in touch with us—that sort of thing."

"Bound to arouse curiosity," I said.

"I assume it hits everybody in an audience, whatever it is," she said. She has a remarkable, elfin face, the color of a very light honey, and the expression on it was as remote as the Home Worlds, and as worried as I'd ever seen. "What would target only subscribers?"

"Well, they're likely to attend more often," I said, "which would expose them more often to a resident plague, if there is one. And offhand, it does look as if something is doing that—the preference for longer-term subscribers points that way, and really doesn't point any other way."

"But what could the Williamson be doing, to subscribers or to anybody?" she said. "It must be something in the hall itself, some sort of chemical leak, or some sort of radioactivity, or—"

"Is your orchestra the only organization that uses Petrarch Hall?"

"Of course not," she said. "There are weekly new-jazz concerts, a monthly series on Syrian music, a lecture series—I forget the topic; does it matter?—"

"And are there lots of unexplained fatalities among subscribers to these other events?" I said.

"I wouldn't know that, either," Marietta said. "Look, Knave, I've been very careful about this. I haven't told a soul—not friends, not close friends, not anybody. I don't want to shake up the orchestra with it, either. And how could I find out about deaths of subscribers to other events, without bringing the whole thing out in the open? I only found out about some of ours—and only some—by noticing that the subscription turnover was awfully high."

"How did you get these printouts?" I said.

Marietta shrugged. "I've got a friend in Vital Statistics; I told her I was thinking of doing a death-related series—*Songs and Dances of Death, Death and Transfiguration,* that sort of thing—and wanted to make some guesses about how my regular audience might react."

It sounded just nutty enough to have been plausible to a Vital Statistician. I nodded and took in a little more good coffee. "And you want me to find out about these other groups, without letting anybody know?"

"I thought you could do it, Knave," Marietta said.

I was stung. "Of course I can do it," I said foolishly. "I'd just like to get straight what you want here."

"Primarily," she said, "I want these deaths to stop happening. And I want whatever's making them happen stopped, too."

It all sounded perfectly reasonable. All I had to do, I reflected as I got up,

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was define a miasma nobody had really seen, and then put an end to it.

I told myself I'd had tougher jobs, and of course I had, though it's surprising how little comfort that is. I was backing away from the table and turning around when a small boy rammed me.

I looked down and to my left, and by God, it wasn't a small boy, it was a small teenager—about four-ten to five feet, with a big shock of red-brown hair, big brown eyes, and a snub nose. And freckles, which made him almost too Hucklebuddy Finn for ready belief. Very late teens, perhaps even twenty, but with a permanent, mid-teener look he was probably going to have at seventy.

He ignored me entirely, rushing right past the scene of the accident and burbling: "Gee—Miss Jink—gee—your Ives concert last week was just splendid, just splendid, it showed me so much about—"

"Hello, Joshua," Marietta said. "Joshua, have you met Mr.—"

"Josh," the teenager said. "I told you it's Josh, didn't I? Sure I did. I never realized before last week that there are moments in the *New England Portraits* that directly echo the Fourth Symphony, but your reading was so clear—"

"I'm glad you liked it," Marietta said. "Meet Mr. Knave, Josh. Gerald Knave."

"Hi," he said without looking around. "I just thought I'd come over, when I saw you, and tell you how good you are, because sometimes I think you don't really know how good you are, Miss Jink. I can hardly wait for the Jerome Moross program—wow, two whole weeks away."

"I think you'll enjoy it," Marietta said, "and I'm looking forward to it myself, though I'd prefer to do *Frankie and Johnny* the way he wrote it, as a ballet. We've got some fine singers, though—"

"I know," Josh said. "Fredi Tallman—it's going to be a wonderful trio. Three sopranos dressed in Salvation Army uniforms—"

"Yes," Marietta said. "That's the way Moross wrote it—a trio walking on to sing to the dancers. And I really do have to go now, Josh, so I hope I'll see you again some time."

"Oh, you'll see me at the concert," he said. "I wouldn't miss it for anything, Miss Jink. Gee—"

Eventually—it felt like an hour and a half and was probably about seventy seconds—we did get out of there without him, and in the AHD lobby Marietta said, in a low voice:

"He's a terrible pest, but he really does love music, and he knows more than you'd think. I suppose everybody has a fan club like that."

"Not quite everybody," I said, and left it at that. Later that day, I started work on the miasma.

I didn't realize just then that I'd already met it.

Getting statistics on the other regular events was very simple. A good rule to remember—it has exceptions, but they *are* exceptions—is that anybody will believe anything you tell him, if he sees no profit to you in the telling. I went around disguised as a sort of scientist—Marietta gave me

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some nice government-type bureau names, and I was Dr. Knave of Whatever Seemed Plausible for a few days—and collected data for a survey of personal habits as a contribution to health. You listen to Syrian music a lot, are you less likely to develop Bell's Palsy? Damned if I know. But I collected a great many facts about a great many subscribers to a great many regular events in Petrarch Hall, and ran it by some census-bureau basics any citizen could get.

And I discovered that the hall was an innocent bystander; the odd deaths were occurring only to Williamson Philharmonic subscribers. There were heart attacks and so on elsewhere, of course, but in numbers that didn't surprise me in the least. The usual number of people, in other words, were dying of the usual number of things.

Query: was the orchestra in some way killing off its listeners?

That did seem the only available alternative—for a very brief while I did consider the notion of somebody poisoning subscription *tickets,* but I tossed it out because (a) unless a mail clerk had gone mad (not unheard of, I do admit), it seemed forbiddingly difficult for anyone to get hold of the things in quantity, before delivery, and (b) and much stronger, I couldn't come up with a poison that would imitate heart disease, aneurysm, and stroke well enough to fool 100 percent of a fairly large number of doctors, spread out over the subscribers. If the planet had been Ravenal, or some other scholarly scientific refuge, I'd have thought twice about that—but there's very little hard science on Apelles, if you except instrument-building, pigment chemistry, toe-shoe manufacture and the like, not at all the sort of background needed.

On the other hand, what the Hell could the orchestra be doing?

It is not normally fatal to play (I choose from the Williamson programs over five years) Wagner, Moross, Shostakovich, Beethoven, Ives, Sibelius, Moussorgsky or even Bernstein. There is an old actors' superstition about *Macbeth*—actors won't name the thing, they call it "the Scottish play," and believe that every revival of it leads to a death—but the Williamson hadn't done *Macbeth* as a play, an opera or a tone poem, and besides the superstition called for only one death.

The Williamson is a classical orchestra—as its programming may have told you—and includes only classical instruments; they do carry a theremin player for the occasional specialty, but Berlioz would have recognized every instrument except the saxophones, and a few twentieth-century percussion gimmicks. (He'd have loved those, of course. There's a passage in his *Requiem* for sixteen kettle-drums.) I'd had some thoughts about the effects of low-frequency sound—sixteen cycles per second, that sort of thing—on the human circulatory system, but nothing in the Williamson would produce that sort of subliminal sound except, possibly, the theremin. And Marietta would have noticed the theremin reaching down anywhere close to that far, in the few pieces for which it was scheduled; as I've said, she was a fine conductor,

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and her ear was beyond cavil.

In the natural course of events, nothing the orchestra was doing would cause longtime subscribers to keel over. Their programming hadn't changed significantly, either; they were playing much the same sort of thing, in the last five years, that they'd been playing before that. But the deaths hadn't been happening six years ago, or eight, or eleven.

I was slowly backing myself into a very uncomfortable corner: we were not dealing with any sort of accident. The deaths were being deliberately caused—there just wasn't anything else to think.

That brought up an additional question; now it wasn't only How, but Why. Imagining a motive looked to be just a bit difficult.

Of course, I didn't really have to imagine a motive, because the person who was killing off all these other people was a human being. That meant that he could easily be even crazier than I thought he had to be, and crazy people, it has been noticed, do crazy things. Perhaps voices in his head told him to kill off people who liked classical music, or people who nodded their heads in time to classical music. Or, in fact, anything at all—voices in one's head don't have to meet even minimal standards of plausibility, as judged from the outside.

With some relief, I stopped wondering about why within hours of the word's arrival in my head.

How was the vital word, and how was going to be tough enough.

The difficulty was that why wouldn't go away. It was going (it promised me faithfully—and inaccurately, as things turned out) to help define how; what was being aimed at was going to tell me something about the thing doing the aiming, so to speak.

For instance: was it supposed to cause death, to cause severe disablement (with death as an unfortunate side-effect), to cause death of a particular sort. . . ?

Why would anyone want to kill (or severely disable) a group of people who had nothing in common except their season subscriptions to the Williamson?

Or (a wildly old-fashioned light bulb went on over my head) did they have something else in common? I hadn't really looked at that.

That question, though, was a job for an army, not a single inquirer. On another world this may not have been so; most of the Comity worlds, and some of the others, are technologically well-supplied. But Apelles has never taken to computers except in the way of computer art and the like; basic records exist on computer because where else would you put them, but, for anything more than the bare basics, computer records simply aren't there. (Artists tend to want to play individual little games with their computers in any case; while I was there, Apelles was much taken up by arguments over the identity of the person loading extremely rude poems about a famous novelist—no names, please—into all the bookstore catalogues, the programs of three dance companies, and the inventory list of a chain of shoe stores.) On Apelles I was going to

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need that army—so I went back to talk to Marietta again.

Apelles does have a murder rate, and a police force; what it doesn't really have is a private detective. There is not much in the way of industrial espionage, for one thing—dance companies (for instance) do spy on each other, and viciously, but the work is handled by amateurs. Capable amateurs, even fiercely dedicated amateurs, but still . . .

And the divorce rate is very low on Apelles—possibly because the marriage rate is also very low. People do get married, but getting married on Apelles is like coming down with Bell's Palsy: some people do, but not too many, and nobody ever expects to.

We had only one army, and Marietta had to be persuaded to use it. She felt strongly that we shouldn't tell anyone about the deaths—murders, I was now calling them—and I had to point out several times, as gently as possible, that continuing to keep things as quiet as that was the sure way of continuing to keep things.

With many sighs and protestations . . . well, a preSpace poet named Byron something-or-other (or something-or-other Byron, possibly Lord) said it best, though like many poets he was talking about sex at the time: ". . . swearing she would ne'er consent, consented."

Marietta, swearing she would ne'er, agreed to meet me at ten-thirty the next morning in Petrarch Hall, along with her army—the Williamson, of course. I spent the night hard at work, I'm afraid, making up lists and checking them twice, and by morning I was ready.

I had one hundred and fifteen musicians, and a list of one hundred and fifteen names. Given a very brief course in question-asking as applied to census records, neighbors and shopping lists, I thought I might just possibly get eighty or ninety musicians to fill a basket full of facts about one dead subscriber each—if I got all the hundred and fifteen I'd be well ahead, and seventy-five was acceptable.

I have no idea what, if anything, this means, but brass players were the most reluctant to volunteer. The orchestra in general took the news with some shock and some argument ("Couldn't it just be a coincidence?" was a favorite question, and the proper answer was No, but I went into a lot of graceful detail), but they were truly fond of Marietta, and I ended with ninety-one investigators, including a terribly serious-minded bassoonist, and a startlingly lovely cellist—and cellists do seem to run to lovely quite a lot.

Each was cautioned to keep quiet about the murders, and to find another reason for inquiries, and I invented a towering pile of such reasons. The session began at ten-forty in the morning, and ended—with short breaks for meals, for reassuring wives and husbands and SOs and children, and so on—at eleven that night. (Apelles has a twenty-three-hour day, if you care about such things, plus eight seconds each hour.) What had originally been scheduled as a three-hour rehearsal session for the Moross, without the vocal trio, never reached the musical stage of things at all.

I now had an entire eight-day week in which to think of other things to do

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while facts were being collected. And the only thing to think about was how.

I put the back of my head to work on the puzzle—it's much brighter than the front of my head, but it works its own hours—and enjoyed Apelles for a while, looking in on galleries, visiting bookstores and payscreens, and smiling through a jazz concert in the Dome. I didn't go to concerts in Petrarch Hall, or to symphony concerts at all—not that I had any real reason to avoid them, but they didn't seem just the thing to do, somehow.

And in eight days, the back of my head had either gone on strike, or fallen terribly ill (without bothering to phone in an excuse) or else was still working hard to no result—because there was no result.

I did have a large pile of facts, and I used what influence Marietta had with the hotel to work with their large-sized computers during the slow hours (for them, nine in the evening to one A.M.). Checking every fact against every other fact was a little too daunting a job for those rigs, but I tossed out a lot of cross-checks that seemed highly implausible (how many people who jog once a week also use Cute Az Buttons Shampoo?) and got matters down to something the computers could digest.

And there was, again, no result. If the subscribers had anything in common, beyond their tickets, and at least some faint interest in classical music, it was beyond me to dig it out.

Which meant that the season subscribers were being killed simply because they were season subscribers. The only other tie, an interest in classical music, was shared by too many others in the audience. And in other audiences.

All right, I said to myself sadly—because I dislike throwing myself straight lines, it is not useful work—all right, who hates season subscribers?

The answer was, of course, immediate. Business managers for other attractions hate season subscribers. There is a limited amount of money and time in circulation, so to speak. Money being spent on season tickets to the Williamson is money not being spent at concerts of Syrian music. Or at circuses, dance recitals, bookstores, comweb share groups—or for that matter fancy groceries or lacy underpants.

But this, though a fair if wordy response to a straight line, was not an answer I could use. If several such groups had been targeted, I'd have looked into it—and looked hard at some of the groups *not* targeted. But no one would be odd enough to try to increase his own market share by killing off subscribers to only one other market out of hundreds—unless that market were doing a perfectly fantastic amount of business.

The Williamson was successful. It wasn't *that* successful. Other orchestras did nearly as well, and some seasons better. (The Williamson seven years before, I heard from Marietta, had decided to unearth a lost composer, and scheduled an entire Mahler cycle. The season did not lose money. Not quite.)

All right, I said grimly: Who *else*

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hates season subscribers?

The answer to that was going to be the answer I needed. I think I knew that even then—when I had no damned idea in the world what the answer was going to be.

So I thought, and I constructed insane theories that didn't work. Poisoned rosin from violin (viola, cello, bass) bows floating out into the audience, and season subscribers the only ones there often enough to absorb enough poison; I do remember that one. Only one real objection, but a beaut: why was the Williamson string section itself still alive? And I ate and drank very well, thank you—the Apelles Hotel defies tradition by actually serving the sort of food one always expects good hotels to serve, though they very seldom do. And when the Moross concert rolled around, I decided to go to one Williamson concert anyhow, and went and heard it. Fascinating stuff.

Frankie and Johnny was the centerpiece of an evening that included Beethoven's *Coriolan* overture, Copland's *Appalachian Spring*, a group of songs by a living composer, Peter Bardolph, and, after *Frankie and Johnny*, the overture to *The Threepenny Opera* to play the audience out with. A short program, but the Williamson under Marietta has always been more interested in quality than quantity.

Bardolph, whose stuff I hadn't heard, turned out to be a Beat. There seem to have been some Beats before the Clean Slate War, but mostly poets, or thought to be so. Some very odd, and one or two very interesting. Now the Beats are musicians, working with beat-notes.

A beat-note is easy to describe, and comparatively hard to hear. Let's say somebody plays a concert A, 440 cycles per second. At the same time, some other rude body plays another note, this one at 445 cycles a second. What many people will hear is a single note, probably the 440 because that's what they're used to hearing.

What many others, and musicians and music-lovers certainly, will hear is a) two notes very close together, an uncomfortable sound, and b) a third note at 5 cycles per second. (No, they won't hear an actual note; people do not hear at 5 cps. They don't hear at much below 20, at best. But what will be heard is an increase and decrease in sound, 5 such increases and 5 decreases a second, a 5-a-second beat. They are hearing the *difference* between the two notes being played, as well as the notes. This difference is called a beat-note.)

A Beat composer—who works a great deal with such beat-notes—presents a Hell of a challenge to singers. Most singers can't dependably produce three- or five- or eight-cycle shadings in notes. Some can, and Fredi Tallman was one of them. Bardolph had written the cycle for her, and it was a pleasure, in its way, to hear her negotiate the damned thing.

In a way. I am not much on tiny differences. I can hear them, thanks, and they make me uncomfortable. If God had meant man to concertize in tiny differences He would not have invented the piano.

The Moross was pure Moross,

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brash and very early-20th and never quite altogether serious. As called for in the score, the three sopranos did deliver the final chorus with beer mugs in hands, one foot each up on a coffin (brought out and just left there front-stage for the second half), as if it were a bar-rail.

This story—ain't got no moral—
This story—ain't got no end—
This story—just goes to show you—
Never put your trust in any man.

And then the whizz-thump of Moross' chords, and a little closing, and one long final chord like a chorale squeezed all the way down to that one.

Silence, and applause.

The *Threepenny* overture was almost an anticlimax, which is something that tiny piece almost never is.

On the way out, I ran into Josh.

The teenage pest was drifting for the doors, being pushed by whichever group he happened to land in front of from second to second. He was being pushed along like a scrap of paper in front of a broom, nodding his head, his eyes shut and whistling under his breath, which is a sound you might go your entire lifetime without hearing. I hope you have, too; it's rather a grating little noise.

A small active group shoved him to one side, and he landed in front of me, still whistling. He was carrying a small suitcase, like a lot of young musicians, and I assumed it was full, as they mostly are, of scores and sandwiches. I said: "Hello, Josh," and was audible over the crowd-mutters.

Of course he had never seen me before. I'd been a blank during his talk with Marietta. He hesitated, then nodded, and stared a little.

"I met you last week," I said. "I was with Miss Jink when you met her at the AHD."

"Oh, sure," he said distantly. "I remember seeing her there."

Charming young fellow. It occurred to me to ask: "By the way, Josh, are you a season subscriber?"

"Me?" He gave me a hollow laugh. I don't hear those much, either. "Think I've got that kind of money yet? No, I'm a second-balcony angel. Up by the dead spot—but usually I go down to the balcony rail to listen. People complain they can't see through me down by the rail, but who goes to a concert to *see?*"

Charming. I did know about the dead spot: Petrarch Hall was built about as well as most concert halls, and up in that second balcony was an acoustic dead spot, hard to hear much of anything from. Hard for the orchestra to hear applause from, too, but then, there usually wouldn't be much.

"Well, some day you'll work your way down," I said.

"Sure I will," he said. "And soon, too—you wait and see. And a hundred old corpses with season tickets will still be holding every one. The waiting list is three years, last I heard."

I marked it down in my head. Another reason to hate season subscribers.

And Josh allowed himself to be pushed forward and off to my left, and I was out the center door. It was a full twenty minutes later, with most of a gimlet inside me at a fairly noisy bar a block away from the hall, that the

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back of my head kicked in.

Idiot, it said to me. It does that a lot, and I have learned to live with it. I waited patiently for it to tell me why, this time.

It did. It told me I had found someone with a real reason, however odd and personal, to hate season subscribers, and only season subscribers.

The reason didn't make a great deal of sense. But, as I vaguely remembered thinking before, it didn't have to—why was always at least fairly likely to be crazy. And this was less crazy than many such reasons: a waiting list, in the first place, that simply had to be cut down fast, and a group of people who clearly needed killing, in the second place.

And, given the reasoner, the reason did look as if it led straight to the actions. If you were Josh, why ***shouldn't*** you shorten that list by any means handy? Why ***shouldn't*** you erase these ugly people who were just taking up space at concerts, and probably not even appreciating the music very much? Not as well as you appreciated it, not anywhere near as well.

If you were Josh—not a reason in the world why you shouldn't. And every casual, sunny, satisfying reason why you should.

I got that far, and the back of my head nodded in some (and somber) satisfaction. And all the rest of me said: "Now, wait a minute. A teenage boy? Josh?"

The back of my head began churning out a list of known teenaged murderers. Known teenaged mass-murderers. It was quite a long list, and even when I narrowed it down to just a planet or two, it was not negligible.

"I don't believe it," the rest of me said.

"Of course you don't," the back of my head told me, in what was almost a friendly tone. "And neither will anybody else—all you have is an idea, just a free-floating idea—unless you can pin down just how Josh is doing all this."

And that, it came to me sadly as I finished my gimlet and ordered one more for the long road back to my room, was a tune I had heard before.

Season subscribers were dying. Dying of diseases related to the circulatory system. Poison, despite the charm of poisoned tickets or poisoned rosin, seemed to be out, because no doctor had spotted any, and the list of Secret Poisons Unknown to Science has shrunk a lot since the Clean Slate War.

And what affects the circulatory system?

Sound will do it. Very, very loud sounds, for instance, will damage not only the ear but quite a lot of veins and arteries. The effect is especially pronounced in the head, but can occur anywhere—people have died from being tied helpless under large bells which went on bonging.

Unfortunately, the effect is not cumulative. Either it gets you or it doesn't—if you walk away, and come back a second night for more loud sounds, you start effectively from scratch. There is a case to be made that there is some residual damage if the first bout was prolonged enough, but any residual damage would be so very damned small it would have no

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noticeable contribution to make to any second-time or eighth-time effect.

And what in God's name could the Williamson have played that would have been that loud, to people merely sitting in good seats in the audience? That bit in the Berlioz *Requiem* for sixteen kettledrums wouldn't do it. Nor would anything the orchestra could have played, I saw—or there would have been a lot of dead people anywhere the same piece was programmed.

I went on back to my hotel room. I sat there and thought for some time, while the gimlets wore off. The back of my head waited with its arms folded, looking superior.

Then, at about three in the morning, I picked up the phone and called Marietta.

Three in the morning, after a concert, is not a bad time to call a conductor. Most of them are very much awake, and still coming down from the excitement. Marietta's voice was just starting to get back to normal tempos, with a few spells of rapid-fire still turning up, and when I asked her to come over she agreed with not the slightest hesitation.

Dimly, that bothered me. She could at least have been polite enough to pretend to worry about her honor.

But Marietta and I were old friends—and, damn it, nothing more. She arrived, and I fed her some oolong—coffee being contraindicated at three-forty A.M.—and sat her down on a sofa. I sat down in a chair nearby, and began to talk about sound.

Very, very loud sound, I said, could have real effects on the human body. She nodded. "What other kinds of sound might do things to people?" I said.

She thought for a minute. "Kinds of sound?"

"Well—overtones, for instance. Something a trumpet might do that a cello or a tambourine wouldn't."

Marietta shook her head. "As far as I know, nothing," she said. "There might be some sort of effect, a specialist might know—"

"It can't take a specialist," I said. "Our murderer is in his teens, and his specialized knowledge is music."

She stared at me. I told her what I had begun to think about Josh, and she strangled on a swallow of oolong.

"Josh?"

I laid it out. Slowly, very slowly, she began to nod.

"There was always something so—odd about him," she said thoughtfully. "Single-minded. As if nobody and nothing else existed but whatever Josh was interested in."

"Well," I said, "he was doing his best to make that one come true." I shook my head. Around Marietta one does not smoke, so I didn't. Determinedly. "But how in Hell was he doing it?" I said. "What would affect people like that? What sort of sound?"

Marietta shut her eyes. It's how some people think. After almost a minute she opened them and said: "A sound you can't hear."

My turn to stare. "A what?"

"Well, for instance," she said. "Almost nobody can hear sixteen cycles per second. Too low. Some people can—I can—but most can't, and go

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below that and nobody can. But broadcast a nice, loud sixteen cps, and people who can't hear it at all will get very nervous. Afraid. Make it loud enough, for a couple of hours, and I think you could cause panics."

"Exactly sixteen?" I said. I remembered dimly wondering about subsonics, a long, long time before, altogether too damned long a time before. The back of my head did not have to say Idiot at me. I was doing the job all by myself.

"It would have to be very close," Marietta said. "Make it, say, fourteen instead, and you—" She stopped with the cup halfway to her lips. "Oh, my God," she said very quietly.

I took a very deep breath. "Oh my God what?"

"At fourteen, you can get circulatory damage," she said.

There was a little silence while I cursed myself (a) for abandoning that thought a full damned week before (and more), and (b) for letting Josh go home with his little suitcase. Then I said: "But—if he broadcast fourteen cps—wouldn't somebody notice? It wouldn't be a sound. But it would be *something*, and something very unusual. And the actual sounds would interfere—hash up his signal. Even if nobody noticed, there'd be too much interference; it wouldn't work."

Marietta shook her head. "He isn't broadcasting fourteen cps," she said. "He's broadcasting long, held notes the orchestra is playing. Lots of them, in every piece ever written, very nearly. He's broadcasting those—almost."

And of course he was. When we got to his apartment, nearly five in the morning, the little suitcase proved it.

Josh knew the scores very well. And he knew the orchestra just as well. Some orchestras tune to a 440 A, some to a 448, some to a 435. Josh knew the Williamson tuning, exactly.

He attended rehearsals when he could. He knew the tempos Marietta would use for a given piece on a given program.

And he set his machine—not a complicated one, you can make one out of most simple sound systems—to play just fourteen cycles out of key with long notes in piece after piece.

As long as he stood near the second-balcony rail, he could blanket the orchestra seats with the beat note—the fourteen-cps difference between what the orchestra was playing and what he was sending—and never be detected. The volume didn't have to match, and if anyone heard his small-volume broadcast it would go down as an acoustic glitch in the hall, of course. The people behind him wouldn't get much, if any at all, any more than he would—he had directional speakers, of course, nicely miniaturized, or he himself would have been dead long before—and Marietta and the orchestra, far ahead of him, got a sound so attenuated that it would have taken better ears than hers to pick it up. Human beings do not have much better ears than hers.

That effect *was* cumulative. The more fourteen-cps sound you took in, over time, the sicker you were likely to get. Season subscribers would, of course, take in the most.

"Killing them softly with his song,"

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I said, one day long after Josh had been quietly put away. (No trial, no publicity—the Williamson would not have done well—just a hearing before a judge and a couple of psychiatrists. And a new home for Josh, where he could listen to music all day long, though only through machinery, and even play some on a ward piano, but would not have the chance to build any new machines of his own.)

Marietta said: "What?"

"An old song," I said. "PreSpace, I think, or nearly. What Josh was doing."

"Well, at least it's over," Marietta said. "And the Williamson can go on playing."

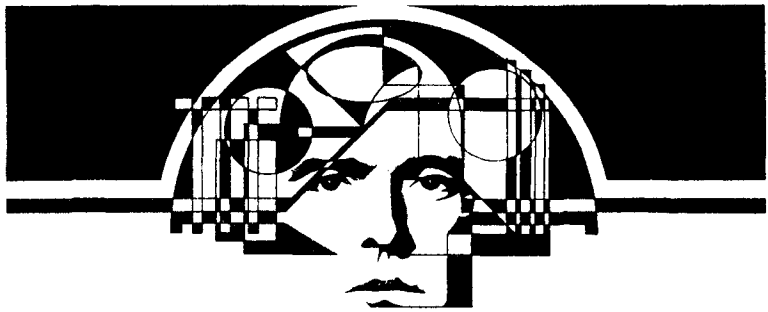
"The Berlioz *Requiem* next month?" I said, and she nodded. "I'll have to stay around for that."

Marietta grinned. "You have a lifetime season pass, you know that," she said. "But seriously, Knave, don't you have other places to go?"

"Not," I said, "immediately." And then I said: "We'd better be going back to the AHD now, though—it is getting late, and you know how I need my sleep."

And we got up, and left Marietta grinning there.

I did say cellists ran to lovely, didn't I? And I did say—didn't I?—that this one ran in a class all her own. ■



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David Alexander

FELONY STUPID

People are easily tempted by quick fixes—often forgetting that ultimate consequences are much slower to develop. . . .

"I appreciate your taking the time to talk with me, Commissioner."

"It's my pleasure, Ambassador. Actually, I've been looking forward to meeting you. I'll be retiring in a few weeks, and the truth is, they don't give me much to do now that they're breaking in the new man, well, the new woman actually."

"We're two of a kind then. These days my title is purely honorary. I'm a full time scholar now at your excellent university. Which brings me to my reason for calling on you. As I mentioned in my message, I'm studying the history of the revolutionary changes in your criminal law and I thought you might be able to give me your personal perspective."

"Well, Ambassador—"

"Call me Luden, please."

The commissioner nodded politely to his guest, then continued.

"It's difficult, of course, from our perspective to truly understand what it must have been like in those olden days, but my family has been in law enforcement for over a thousand years. I like to feel that that gives me some perspective on this topic."

"As I'm sure it does."

"In fact, in preparation for your visit today, Luden, I've called up from my family's personal archives a vid record from the very beginning of that period."

"Really? An original record? An execution?"

"Oh no, nothing like that. In those days the lawyers often disposed of cases right there in the courtroom before the judge made his appearance."

"How medieval!"

"Yes, that was my reaction as well. In any event, the courtrooms were

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equipped with security cameras that were constantly in operation. Apparently, at some point in the process there was a disagreement over this particular 'disposition' they called it, that I'm going to show you, and the video record was copied and made part of the file. One of my ancestors was the government's representative, a deputy district attorney I believe was the proper title, and for reasons of his own he saved a copy of the sequence."

"Commissioner, I'm overwhelmed. Can we view it now?"

"Of course. It's a flat-pic, naturally, but my predecessors have enhanced it to the limit of our technology and the quality's quite good. I'll key it up for us over there." The commissioner gestured to the wall on the far side of the room which flickered through a spangle of colors then a moving picture snapped into sharp focus. The initial image was of two men in ancient formal garb, each seated at the front of separate but adjacent wooden tables with a third man positioned at the far end of the second table. Unlike the first two, this man was dressed in plain blue work clothes and manacled at wrist and ankle.

"Those two are the lawyers, then?" the ambassador suggested, waving at the screen. "Which one is your ancestor?"

"The one on the right; the man dressed in the dark gray costume. The other lawyer, his name is Eddie Manion, is the defense attorney, and, of course, the criminal, Willard Weeks, is the man in restraints. Listen now, it's beginning."

* * *

"Yes, he's a moron, but not that *much* of a moron," Eddie Manion insisted with a whining edge to his voice.

"Oh, I don't know," the deputy district attorney said as he slowly looked the accused up and down. "It says here that he wrote the holdup note on the back of one of his deposit slips."

"Yes, but it was an *outdated* deposit slip. It didn't have his current address on it."

"It had his right name though, didn't it?"

"Well, yes, but—"

"He'd left a forwarding address, hadn't he?" the DA suggested, guessing.

"Not exactly. Not with the post office."

"But he had told his landlady and his old roommate where he was moving?"

"Perhaps, but—"

"Eddie, give me a break."

"Bob, can't we make a deal?"

The commissioner's ancestor, Robert LaTureene, took a second, longer look at the defendant, a bedraggled, puffy young man with thinning, straw-colored hair, protruding ears, a receding chin, and a sheen of oily perspiration glistening from his forehead and cheeks.

"Mr. Weeks," the DA said sharply, "How much money did you think you were going to get from the robbery?"

"Uh, Mr. Manion, can I—?"

"No use as to guilt or innocence of the underlying charge, right, Bob?"

"Fine."

"It's OK, Willard, you can answer

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Mr. LaTureene's questions."

Willard Weeks shifted uneasily in his chair, glanced down at the floor, then raised his eyes to stare at the DA at an oblique angle.

"Uh, I don't know. Two or three hundred dollars I figured."

"What were you going to do with the money?"

"You mean after lunch?"

"Excuse me?"

"First I was going to buy lunch, a real nice one at the Sizzler."

"Yes, what were you going to do with the rest of the money, after lunch."

"Well, I guess I was going to, you know, get some stuff."

"What kind of stuff?"

"Oh, you know, some jeans and sunglasses, and maybe find a girl, go out on a date."

"You were going to use the money to buy a hooker?"

"No sir. That wouldn't be right. I seen lots of real pretty women down there by the park, you know, roller skating. I figured I'd meet one of them."

"Do you have a pair of skates?"

"No, not yet."

"Let me get this straight. You were going to buy a pair of roller skates with the money from the robbery?"

"I thought I might."

"Did you know how to skate? Had you ever done it?"

"No sir, but it looked pretty easy. I figured I could learn as soon as I got me a pair of skates."

"Why didn't you just rent them?"

"What?"

"Roller Blades cost well over a hundred dollars. Why didn't you just rent a pair and see how it worked out?"

Weeks stared blankly at the wall for several seconds while he considered the DA's question. Finally, he gave a small nod.

"You know, I never thought of that. That would've been cheaper than buying them, then?"

LaTureene shook his head slowly then turned back to Willard Weeks.

"Mr. Weeks, one more thing. About the note you gave the teller at the bank--"

"Yes sir."

"Why did you write that on the back of one of your old deposit slips?"

"Well, you see, I used to have a checking account, but they closed it because I kept running out of money, so I had all these old checks and things. I figured that if I went into the bank with a checkbook and then started writing in it, it would look real normal like. So, I turned over one of the old checks and wrote the note there at the desk, just like I had real business in the bank."

"Did you forget that the checks all had your name and address on them?"

"No, but it wasn't my right address. Besides, it was on the other side from the note. I just figured that I'd take the note back with the money."

"Why didn't you?"

"Well, when she started scooping up all those bills, I mean it was a lot more than the two or three hundred dollars I had figured on, so I thought, 'Whoooe, this is my lucky day!' and I got so excited I guess I forget to take it with me. Then, when I got halfway out the door, I remembered it, but it

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was too late to go back for it."

"Because the teller had sounded the alarm?"

"No sir, but there was a man there at the window, you know the next person in line, and I couldn't just cut in front of him and I sure couldn't start again at the end of the line, so I just left with the money and hoped they wouldn't pay any attention to the other side of the paper I wrote the note on." Weeks paused for a second, then said sadly, "But I guess they did, though," then he frowned, and looked back down at the floor.

"Thank you, Mr. Weeks. Eddie, do I have to say anything more?"

"What are you suggesting, Bob. You're not thinking TSTL? That would be a travesty in this case. I can't—"

"Relax, Eddie. The Feds will waive jurisdiction on this. He'll plead to the grand theft, do two years. With time off for good behavior he'll be out in eighteen months, provided he accepts TSTR."

"I—"

"It's a good deal, Eddie, and you know it. On these facts, the right jury might just find TSTL. You want to take that chance?"

"Let me talk with my client."

The two men whispered together, their conversation dropping to an indecipherable murmur.

"We've tried to reconstruct that section," the Commissioner apologized, "but the sensors in those days . . . well, there just wasn't enough of the signal present to do us any good."

"TSTL, Commissioner? That's—?"

"—Too Stupid To Live. yes."

"And TSTR would be—Too Stupid To Reproduce?"

"Yes, those were two of the vernacular terms. In common parlance, the catch-all phrase was 'Felony Stupid.'"

"But those terms weren't part of the formal usage as I recall."

"That's right. The history is quite interesting, really. Initially, my countrymen adopted a punishment enhancement if a weapon was used in the commission of the crime. Some years later they enacted a further punishment enhancement if the criminal had a long record of other serious offenses. From there it was a relatively short step to enacting a modification of sentence if the convicted defendant was deemed to be so stupid as to be a danger to the society in general.

"TSTR's were the more common enhancement. The official name for the sentence was a 'Genome Protection Procedure,' or GPP."

"Was this fellow, Weeks, really in danger of being found to be TSTL?"

"Oh no. My ancestor was merely using that threat as a bargaining chip. The truth is that TSTL's were only imposed on the most vicious and irredeemable criminals for whom a death sentence could not otherwise be levied. Unless he had shot two or three people during his little robbery, that fool, Weeks, would never have rated a TSTL, or as it was officially known, a DFRP, Dangerous Felon Removal Procedure—oh, look, Manion is done talking to his client."

"We're talking standard V-job here, right, Bob? There aren't any sexual aspects to this case and I don't want any

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suggestion of a castr—"

"Straight Vasectomy. No MDSO implications. The government will even pick up the tab for the procedure."

"I want a guarantee of no more than a two-year sentence."

LaTureene pursed his lips slightly, then nodded and stuck out his hand:

"Deal."

"Deal," Manion agreed and, as their hands met, the pictured misted, paled to gray, and faded to invisibility. The last image Luden Fornell noticed was a peculiar expression of mingled relief, confusion, and despair fleeting across Willard Weeks's face.

"Amazing, isn't it?" the commissioner said when both men had turned away from the screen.

"To say the least. And to think that practice went on for generations! One wonders. . . .

"I know, but think about it. It seems so simple. So intuitively correct."

"In this case, their intuition was clearly wrong."

"It usually is. Intuitively correct decisions are usually the most dangerous. They ignore the subtleties that can turn an ordinary mistake into a truly horrific one."

"As they certainly did here. Didn't your ancestors know anything of genetics, Commissioner?"

"One would have thought so, but whatever they knew, they ignored in their single-minded quest to eliminate the criminally stupid. We're still paying the price for that error, of course."

"Yes, I'd say you are. It still amazes me that they didn't understand that if you eliminate all the stupid criminals—"

"—Then all you're going to be left with are smart criminals. Yes, they culled the herd as it were. Year after year, generation after generation, they kept sterilizing and killing the dumbest members of the criminal classes so that with each generation the lawbreakers became smarter, more clever, more devious. Oh, to be back in those halcyon days when a policeman could depend on the criminals to be fools, to make dumb mistakes, to blurt out their guilt at the drop of a hat! It must have been heaven. Now their intelligence level is ten points above the mean."

"Ten points!"

"A bit more, actually. If only my ancestors had only slightly changed their policies. If only TSTL and TSTR had meant—"

"—Too Smart To Live, Too Smart To Reproduce," the ambassador broke in, completing the commissioner's thought.

"Quite so. If only they had had the sense to make it Felony Smart," he added, wistfully. ■

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Maya Kaathryn Bohnhoff

PIPE DREAMS

It's hard enough to keep track of one reality. With more than one . . .

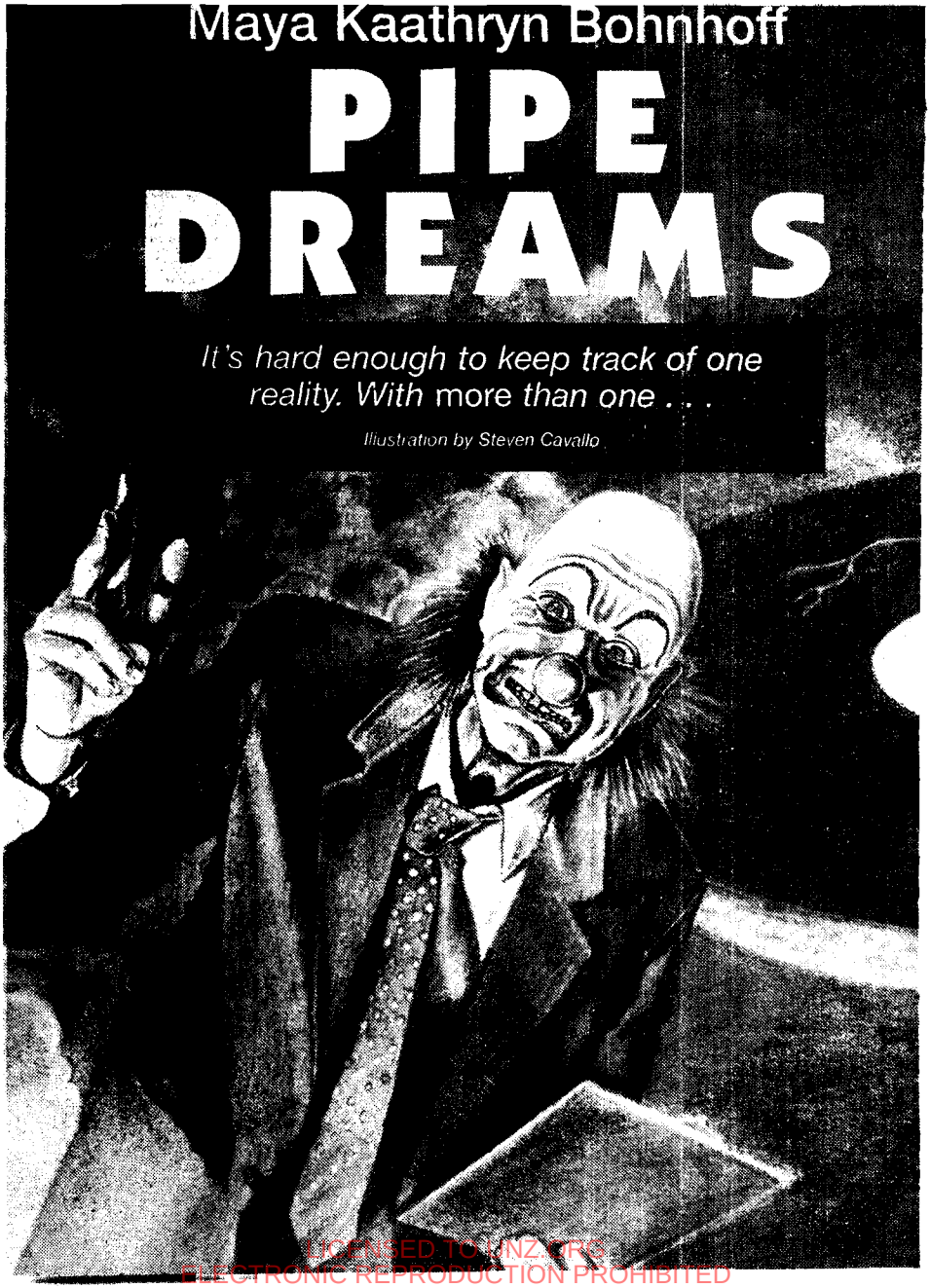

Illustration by Steven Cavallo

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It was a normal day for Beckett Hodge. Which is to say an extraordinary day, for Beckett Hodge attracted extraordinary situations, things, and people the way black pants attract white cat hair.

Beckett—Beck to wife and friends—was, to outward appearances, an archetype—the mild-mannered and somewhat nerdish professor of computer science, habitually forgetful and distracted, his mind engaged in a never-ending background computation. He did not drink; he did not swear; he forgot his own birthday and resorted to electronic wizardry to remember his wife's. He was a renowned lecturer and an author, too, of thick, arcane tomes about AI, nanotech and enviro-programming; every one written in what his wife, Marian, called "technese."

In Beckett's head, he was a fictioneer—a storyteller—though no one had ever read a word of his fiction. The clutter of scientific and academic accomplishments was merely a source of income, something he just *did,* the same way that he breathed, ate, slept and performed other necessary functions.

Beckett Hodge wanted people to be as impressed with his fiction as they were with the rest of the things he did, but as he approached his thirty-sixth birthday, that goal seemed no closer than it had the day he first opened a word processor file to write about something other than neural nets, bio-computing, and self-policing AI security systems.

He was bemused by his academic publisher's lack of interest in seeing a work of fiction with his name on it. "You write like a programmer," Terrence Lance had said, upon reading Beck's synopsis for a novel. When Beckett failed to see the problem with that, he'd added, "Write what you *know,* Beck." Beck disregarded the commentary. After all, the fellow edited and published textbooks, not novels. He had downloaded the synopsis to three publishers anyway, using his academic credits to get a foot in the electronic door. Nearly six months later, he was still waiting for the door to budge.

He put that out of mind now and assembled his lecture notes, penned neatly on yellow legal paper. He loved the feel of paper between his fingers, the smell of it when he flipped a page. It was a soothing touch of realism for a mind that habitually courted the abstract. He loved the smell of magazines and books, too. In his vivid imagination, the pages that held his own fiction were especially savory.

He brought his mind firmly back to the here and now—not usually so difficult a thing for a man who lived for the nanosecond—and began his lecture on the dynamics of programming the mood-sensitive entertainment system. The hall was packed; students stood along the walls and in every nook and cranny that would hold a body. Beck knew his peers speculated about his popularity—was it the subject matter or the fact that he reminded his students of a Disney character who might any moment begin lecturing on "flubber" instead of silicon?

When the lecture was over, Beck had a series of appointments: one with the head of the life-science de-

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partment, one with the board of directors of a major financial institution, the third with his government liaison, Colonel Traynor. The department head wanted him to consider teaching another class in nanoprogramming, the bankers wanted to commission him to design one of his patented security system for their customers' valuables, Traynor was negotiating enhancements to a security and defense system Beck had put in place the year before for the Department of Defense.

He didn't want to teach another class in nanotech, and said as much. He found it difficult to concentrate during the meeting with the contingent from First Continental Finance. He accepted the job with his mind on how he might punch up the opening of his latest attempt at a novel, saw the bankers out of his office, and settled in to grab half an hour of writing time before his military escort arrived to take him to his next meeting. He wasn't certain he really wanted the First Continental job—it would distract him just that much more from his writing—but he supposed Marian would think him foolish to turn it down. And as to the military contract . . . He disliked working with the government in a vague, abstract way. They were an incredibly paranoid group of people. He had difficulty thinking the way they did, but Marian said that was because he was naive. The thought brought a smile to his wide lips. Marian could say things like that and mean them as compliments.

To Beck, the DOD was a paradox: having determined never to use their deadly arsenal of nuclear weaponry, they must now make certain no one else could use it either. It was as if a man had purchased a gun to protect his home and family, only to decide he couldn't bring himself to point it at anyone and pull the trigger. It was therefore necessary to go to great lengths to hide the gun, to lock it away in a series of increasingly forbidding vaults, complete with booby traps. The whole idea seemed absurd, and despite the fact that the contract would bring him several million dollars by completion, he would have still cheerfully advised the government to simply get rid of the gun—or at the very least to unload it and throw the bullets away. Instead they had opted for a "vault." Now, they wanted it strengthened and enlarged.

The meeting with Traynor was cordial and orderly and Beck could hardly wait to get away. Specs in hand, he had the driver take him straight home. He was in a hurry to get into his office to get to work. The notes on the first chapter of his novel were burning a hole in his briefcase.

Marian was already home. "Took off early," she said, handing him a glass of orange juice. "Had a lunch meeting with Liz Harris. God, that woman gives me a headache. Acts like she's our only account. You have e-mail from a publisher."

It took him a full five seconds to catch that, even though he'd had ten years of practice sorting through the diverse information his wife could layer into her dialogue. "I what?"

"I checked the mail." He was already on his way into the office, orange juice sloshing; she raised her

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voice. "Some guy named Bourbon—Seton House, I think."

The name was Laurence Bourbon. The publisher was Sefton House. The message made a sharp, shrill tingle of anticipation vibrate up Beck's spine: *I'm going to be in Boston next week and I'd like to meet you and discuss your manuscript. You have some very interesting ideas and I think we can work together. Lunch Tuesday at the Sheraton? Please let me know if this is agreeable.* His Internet address followed. There was a 3-D scan with the message, showing a smiling man, probably above middle-age, with sparkling dark eyes and distinguished streaks of gray in his dark hair and beard.

Shaking, Beck dropped into his chair and logged onto the Net. *I find it very agreeable,* he sent back. *Around one? I have classes until noon.* He sent back a canned scan of himself so Bourbon would be able to recognize him. The reply came while he was sitting there staring at the original e-mail, sipping but not tasting his orange juice. "You have mail," the computer informed him.

One is fine. Meet you in the main lobby. I look forward to it.

Beck felt a hand on his shoulder, followed almost immediately by warm lips at his ear. "You're shaking," Marian murmured. "I used to do that to you, once."

Beck was not so much the absent-minded professor as to miss that cue. "Why don't we go into town tonight? We'll have dinner and go for a long walk in the Commons."

She was watching his hand where it lay atop the keyboard, fingers just caressing the keys. "We'll grab a quick bite at Giovanni's and come home. That'll give you about three hours to work on chapter one. Be in bed by eleven." She left him alone to save his precious messages and read the rest of his mail, swaggering out of the room while swirling her orange juice in the rounded glass as if it were expensive brandy in a snifter. He noticed—he always did notice—how lithe she was, how long and catlike. She walked like a gunslinger. He, nerd, wondered how he had ever managed to snare a Marian.

The rest of the week was a blur of lectures and programming and anticipation. He got a lot of work done on the Pentagon Piece, as he called it, adding subtle and not-so-subtle nuances to his existing system. And he actually made a decent start on the "Bank Vault" program as well. Surprising, considering that in every spare moment he was noodling with the novel.

Marian's business partner, Ruby, thought that was silly, "Considering," she said, "that someone's shown interest in the book as is."

"He may want changes," Beck told her.

"Mmhmm, but will he want the ones you're making?"

That disconcerted him so much he spent Saturday and Sunday fully engaged in his programming with only half an afternoon out to go bike riding with Marian (his concession to her insistence on regular exercise) and start work on a short story which would no doubt end up in the same elec-

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tronic file folder all his other unpublished short stories ended up in. He'd never had the temerity to publish even one of them on the Net. It wasn't anonymous enough.

The Sheraton was corporately bland in its ostentatiousness; its foyer gleamed with brass that reflected only muted beiges and peaches. The potted foliage that decorated the place wasn't real, nor was it intended to look real. It was intended to look alien. It didn't. It looked like naked, airbrushed manzanita and cinchona spangled with tiny faux seed pearls, or draped with locks of gold and peach silk, that gave the impression of poodle-dyed Spanish Moss.

Beck eyed it with vague queasiness as he waited for the concierge to check him through to the elevator to the Tower suites. He was impressed in the extreme. He'd thought that the wealth in the publishing industry was invested in those who wrote, published or owned the movie rights to the latest multi-generational saga, horror classic or mucus-making romance. That Laurence Bourbon could afford such accommodation set him to musing about the differences between academic and commercial publishing. No textbook editor he knew could afford such luxury.

Bourbon was a tall man, Beck's height or better, dapperly dressed in a suit with gleaming white shirt and red silk tie—an Ascot, not a Windsor. He was polished, urbane, even suave, yet his face seemed open, friendly. Humor sparkled in his dark eyes. Beck liked him immediately and allowed his hopes to rise. More so when he saw a printed copy of his manuscript sitting in the middle of the round, glass-topped table at which Bourbon bid him seat himself.

"Dr. Hodge," the publisher said expansively, sitting opposite him.

"Uh, Beckett, please . . . or Beck . . . whichever."

There was a carafe of coffee on the table, Bourbon spoke as he poured. "Beckett, then. I'm very glad we could meet like this. And on such short notice." He put down the carafe and laid both hands flat on the manuscript. "I don't mind telling you, this is quite a book."

Beck could feel his skin flushing. "I don't mind hearing it. I'm surprised you actually wasted the paper to print it. Surely, a cyber-reader—"

"False modesty, Beckett, seldom impresses an editor. This is a good book. Very solid. Exciting plot. Interesting characters. Especially Martin, your programmer/mage. Your knowledge of programming certainly comes through."

Beck chuckled. "My textbook editor says I write like a programmer. He's suggested to me that I should stick to academics and leave fiction to people with imagination."

Bourbon shook his head. "I can only think he's afraid of losing you to fiction. This novel shows a *vivid* imagination. At the same time, you apply your science extremely well. I'm impressed . . . obviously, or I wouldn't be here. I hope you don't mind my idle chatter, but I like to get to know my writers."

His writers. Beck had the absurd

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desire to grin. He gave in to it and hid the grin in his coffee.

"Now, as to possible contracts," Bourbon continued, then shot a glance at his watch. "I've an appointment shortly; could you drop by this evening . . . oh, around seven-ish? We could discuss terms. . . ?" He spread his hands, leaving the ball in Beck's court.

Beck was ready to jump at that, but remembered before he'd opened his mouth to accept that Marian had no idea what was going on. "Can we do it tomorrow? My wife and I have a rule. We never make last minute, solo plans without consulting each other—especially after hours."

Bourbon's brows twitched. "There's the phone."

"She's on a buying expedition today. It . . . it wouldn't be fair to spring this on her. She might have—er—plans for us this evening." He flushed, hoping Bourbon wouldn't inquire as to what kind of plans.

"A possessive woman, your wife?"

Beck had the impression the questioning tone was tacked on as an afterthought. "No, she's not really. Well, I mean, she *is*—but we *both* are. It's hard to explain, but we both have such hectic schedules and put in such long days; our time together is very precious to both of us. Tomorrow, maybe. . . ." He trailed off, feeling vaguely idiotic—like a man who's won the lottery only to balk at having to go down to the bank to pick up the check.

Bourbon's smile was quick and bright. "Tomorrow's fine. Some more coffee?"

Beck relaxed into the depths of his chair as they discussed some changes to the manuscript—all of which seemed impossibly minor. He left the Sheraton riding the crest of an adrenaline wave, eager to bring Bourbon a slightly reworked first chapter. He got home, had the house play an entire library of Vivaldi and Blue Oyster Cult, and worked on the book for what only seemed like minutes before Marian's appearance at his office door interrupted him.

"What're you doing home?" she asked, brow wrinkling. "Don't you have classes this afternoon?"

He stared at her for a full two seconds before he realized she was right. He *did* have classes this afternoon—or rather, he would have had, if he'd remembered to go to them. Swift heat suffused his skin. "I . . ."

"Lost all track of time," Marian finished for him. She laughed, leaned over and kissed his forehead. "Beck, honey, I think you're halfway to discovering the secret of time travel."

"What's up?" The female voice came over Marian's shoulder from the doorway.

Beck mumbled, "Hi, Ruby," and tried to decide whether he should get up and race down to the campus in an attempt to retrieve his last class of the day, or to just call in and plead that he'd felt ill (cough, cough), taken a nap and . . . lost all track of time.

Marian's partner, Ruby Wilson, sauntered into his office, arms folded across her substantial chest, and said, "You're not supposed to be here."

"Save file," he told the computer. He looked up at her. "Are you having a secret meeting?"

The two women glanced at each

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other. "Yes," said Ruby, "we're part of a coven of cyber-witches and we're having a ritual sacrifice this afternoon in your backyard."

"No, no." Marian shook her head. "That's Tuesday. Today is the secret swearing-in ceremony for the new members and, of course—"

"The orgy," finished Ruby, nodding. "How could I forget?"

"So are you just going to sit there?" Marian had folded her arms across her chest, too, and was glancing between him and the antique walnut wall clock that hung over the mantel piece. "Shouldn't you go over and catch the fallout?"

"I could call. . . ."

"You could," agreed Marian, "but then again, you *could* still catch your last class."

Beck glanced at his computer screen—longingly. His sense of responsibility kicked in hard. He saved the file a second time, idled the machine, popped out the memory core, pocketed it and headed for his car.

The two women watched him from the *lanai* at the front of the house, side by side, waving at him. *Like conspirators*, he thought, then wondered where the hell that had come from. It came to him as a surprise that he hadn't told Marian about his book deal. It came to him as an even greater surprise that he was reluctant to tell her. He was a man who often dealt in secrets, and, because of this, he shared everything he could with Marian. It was odd, he thought, that this secret was one he rather relished keeping.

He was just able to salvage his last class, then logged onto the school Net to apologize to the students he had stranded, promising not to let it happen again. Then he went home. Ruby was gone when he got there, and Marian, fresh from a shower, was sipping orange juice on the *lanai* while the house audio system gave forth the sylvan sounds of a Northwest Coast rain forest.

"So, talk to me," she said, when he'd kissed her forehead and folded himself into the seat across from her at the bistro table. "How was the appointment this afternoon?"

He hesitated, but the secret refused to remain a secret. He grinned. "It was terrific, Marian. Absolutely terrific. This guy really likes my book. *Really* likes it. He had some suggestions for improving the first couple of chapters—"

"Did you sign a contract?"

"Not yet, but—"

"You shouldn't really make changes until you see the whites of President Grant's eyes."

He stared at her, bemused. "He *wants* the book, Marian. He just wants to see if I can correct a few things."

She nodded. "What was the name of the publisher again? I told Ruby it was Seton. She said I must've meant Sefton. It isn't Sefton, is it?"

"It's—" He broke off and looked at her. That question had an agenda behind it; he could tell by the tone of her voice and the fact that she was gazing into the bottom of her OJ glass, not into his eyes. "It's Sefton. Why?"

"Do you know what their last big publication was?"

"Not right offhand."

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"*Voice from a Burning Bush* by Ibrahim X."

Beck shook his head.

Marian leaned forward and grasped a handful of the hair at the back of his head. "Sometimes, my beloved husband, you are too much of a nerd to live. Ibrahim X was the self-proclaimed ringleader of the Shalom/Salaam terrorist group. You might have heard of them if you read the news we subscribe to. Sefton made a killing on his book, which is basically a 'how-to' manual for wannabe terrorists and a self-serving justification for mass murder. It generated a heated First Amendment debate in Congress and all sorts of bad press for Sefton, the net effect of which was record book sales and handsome royalties for one and all." She stopped talking and just looked at him.

He waited a beat. "And?"

Her grip on his hair tightened. "You're going to deal with these people? People who've figured out a legal way to make a buck from terrorism?"

Beck did not swear. Marian did occasionally, and he had no doubt she would be doing it shortly if he did not answer her questions in the appropriate manner. Beck, mounted on the horns of a dilemma that was at once clear and impenetrable, wished he did swear. A good solid, "hell" or "damn" would feel somehow purging. Instead he asked, "Are you sure?"

"I'm sure about the book and the author. Ruby's sure about the publisher." She let go of his hair. "Seriously, Beck. How can you do business with people like that?"

"Sefton is a big company. I'm sure their fiction department—"

"Cop-out." She got up from the table, chair sliding back with a metallic groan.

"Marian—"

"Cop-out, cop-out, *cop-out.*" She disappeared into the house, the screen door sliding behind her with a slight popping sound. The rain forest fell silent. Some of Marian's exits, Beck thought, really ought to be followed by the sound of a door slamming.

They argued about it further over dinner. He refused to make commitments of either feeling or intellect and she refused to see what a rejection of Bourbon's offer (or potential offer) meant to him. He was not good at verbalizing emotion, but in the eleventh hour, he gave it a good shot. "Look, Marian. Try to understand. I see the bigger moral issues, really I do. But they're not my issues. I just want to publish some science fiction. It has nothing to do with Mr. X or his book. I may be a hot-shot when it comes to AI systems, but I'm nobody when it comes to fiction. Bourbon could change that. This is something I've dreamed about for years. For decades. My stories in print, Marian. My name on a book of fiction."

"And what about principles, Beckett? *Your* principles."

He shook his head.

She went to see Ruby. He removed himself to his office and pecked at his manuscript, all the while imagining the two of them, hunched in a booth in their favorite latté bar, dissecting his character as if he were a piece of bad fiction. In the backwash of angst, his POV character took on a

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decidedly cynical bent.

Marian didn't get home until after eleven, making a mockery, Beck thought, of everything he'd said to Laurence Bourbon about their "rules." He was lying in bed, feeling a little betrayed, when she lowered herself into bed next to him. They drifted into sleep without touching.

By morning, Marian was curled in Beck's arms and he had a hazy memory of hot sex during which he had played a decidedly non-aggressive role. He thought he'd dreamed of Marian riding through a stormy sea dolphin-back. It was a strangely erotic image. He wondered if he might make use of it fictionally.

She fixed breakfast for him. That was an unspoken apology, but she was still nettled by the whole terrorist thing. "You know, it's possible that your publisher friend even knows who Ibrahim X is—and where he is."

"I doubt it."

"Well, think of it, Beck. Money has to change hands, manuscripts have to be delivered. Even if it's all done through an agent of some sort, *somebody* must know *something*."

He glanced up at her over the rim of his coffee cup. "And?"

"He's wanted by the World Tribunal, for godsake. He's a criminal. If somebody knows where he is, they should turn him in."

"Look, Marian. 'Somebody' knew where Salman Rushdie was for years, but his enemies were kept in the dark until their regime fell. These people are obviously clever."

"So are you."

Hair stood up on the back of his neck. "You want me to spy? What—vigilante espionage? I'm not a spy, Marian. I'm a programmer."

"A programmer whose business is to *thwart* spies—"

"Not even in the same *county*, Marian." He got up and collected his briefcase. "I'm a nerd. A nerd who writes science fiction. If I wrote spy novels, I could see how you might get the idea that I could do counterespionage. But I don't write spy novels, and I'm not even going to be working with the editor who handled the *Burning Bush* manuscript."

"Are you sure?" she asked.

He wasn't sure, but he pretended to be. What would a science fiction editor be doing with a controversial non-fiction manuscript? "Here's another thought for you and Ruby to toss around," Beck said as he headed for the door. "What if the whole thing's a hoax? What if they got some ghost writer to make all this up based on news files, and just promoted it as the real terrorist?"

"That's dishonest. You're telling me you'd work with a publisher you knew was dishonest?"

He left without answering the question.

He had only morning classes today and spent the afternoon, until nearly 3:00, working on his commercial programming contract. The bank routines were proving problematic. Continental wanted some of the same safeguards he had incorporated into the DOD software, but national security dictated against his using the

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same code or anything remotely like it. As a result, he had to come up with new approaches to old problems—a nice enough challenge, but Beck was soon frustrated with the number of times he had to pull himself up short, realizing he was on too familiar ground.

At 3:15, he kept an appointment with Bourbon in his Sheraton suite, bringing along his edited pages to show. Bourbon read them in complete silence—not so much as a "hmm" or a nod or a throat clearing to mark his progress. Beck sipped a virgin daiquiri and wriggled like a middle-school kid at his first dance.

In the end, the editor raised his head and smiled. "Good edits, Beckett. I especially like the rougher edges you've put on Martin James." He paused, nodded. "I think we can work together." He rubbed his palms together in some sort of symbolic gesture, then reached out to shake Beck's hand. "Now, about contracts. I'll have them downloaded from Sefton so you can go over them tonight, review the terms and sign them at your leisure. I'm going to be in town a few more days, as it happens."

Beck nodded. "Uh. Terms?"

"Well, in view of your other work—your scientific publications, et al, I've been authorized to offer you an advance of twenty thousand against royalties."

Beck was still nodding. "Twenty that's . . . that's great." *Damn Marian, anyway,* he swore silently. He should have been savoring this and wasn't, because she and Ruby had raised the shade of Conscience. "Um. I was curious. Sefton published *Voice from a Burning Bush,* didn't they?"

Bourbon's eyebrows rose delicately. "Yes, we did."

"You wouldn't have been the editor to handle that property, would you?"

"Why do you ask?"

"My wife was . . . curious about how that sort of thing is handled. I mean with the author being . . . who he is and all." He offered up a half-hearted smile. "I think she fancies I might get into writing spy novels or something."

Bourbon's mouth tilted wryly. "I'm afraid I'm just a science fiction editor. Mr. X did not enter Sefton through the servant's quarters, I assure you. He had an editor from the non-fiction side of the aisle."

Beck shook his head. "Servant's quarters? I don't get it."

"Inside joke of the genre ghetto, Beckett. Finish your drink. I'll get those contracts going."

Beck glanced at his watch. "How long will it take to download them? My wife . . ." He broke off, clearing his throat. He was relieved when Bourbon didn't react.

"I understand. It will take but a moment." During that moment, Bourbon came back to the table and seated himself, pouring Beck a fresh, cold refill of creamy, pink crushed ice. "You know, Beckett, I really hoped we'd have an opportunity to talk programming. I've got this little AI project I'm working on for Sefton—" He broke off with a self-deprecatory smile. "Well, I'm only coordinating it, actually. I'll probably hire a real programmer to do it, but I'd like to at least help design it."

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Beck was immediately interested. "Oh? A maintenance system, security—which?"

"A little of both, actually. You'd be surprised at the type of security problems we have in the publishing industry. Especially a house like Sefton which has a number of celebrity authors."

Beck sipped at the daiquiri, trying to hide behind it. "Like Ibrahim X?"

"Yes, like that. Like J.R. Koenig. I can't tell you the number of times our system has been hacked into and his manuscripts downloaded and distributed over the Net before we can get them to press. There's a lot of money lost there for our cyber-press division, as you can imagine. Koenig even tried downloading a manuscript to us under his wife's name and e-mail account. The hackers still got to it before we could publish it."

"Sounds like it could be an inside job," Beck said. "Are you sure you can trust everyone who's working for you?"

Bourbon grimaced. "You may be right. And no, I'm not certain of everyone in our employ. But I thought, perhaps with your advice . . . I'm, em, not above taking advantage of this situation. I hope you don't mind." His smile betrayed embarrassment.

Beck flushed, smiling. "Of course not. I'd be happy to talk shop with you."

"Tomorrow night, perhaps? A late dinner here?"

"Ah . . . how late?"

"Ninish?"

"I don't know if I can, on such short notice, but I'll try." For the first time, Beck felt a spark of resentment for Marian's possessiveness. It was embarrassing to seem so . . . well, henpecked. He had the absurd desire to puff out his chest and proclaim adamantly that he most certainly would be there for dinner the next evening. He opened his mouth, but nothing came out.

"I'd appreciate it. I'm really quite stumped by our hacker/thief."

When Beckett left the Sheraton, he was surprised to find himself standing on a lamp-lit street. Somehow it had grown dark while he chatted with Laurence Bourbon. Puzzling, but not distractingly so. He drove home in a haze of buoyant cheer, ready to reconcile with Marian. But, though her car was parked in the curving drive when he arrived home, the house was dark.

Out with Ruby, no doubt, who would commiserate with her about having a husband who stood her up for dinner without notice. The aroma of Kung Pao still hung in the kitchen, making Beck salivate. Guilt warred with irritation and hunger. He grabbed a white carton from the refrigerator and headed for his office, deciding he'd work on the First Continental program while he waited Marian out. He would save the contracts for later, when he could savor them. He slipped the memory core into the computer, put on VR half-helm and gloves and let himself into the program.

It was a bigger mess than he remembered—a crazy-quilt of mismatched security fail-safes. He was deep into it,

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working on a lock for one of the bank's massive data vaults, when a blinding flash of light all but knocked him from his chair. His head felt suddenly cool and light, as if—

"Beckett Hodge, what the *hell* are you doing?" Marian emerged from the haze of light wearing a rumpled, overlarge Red Sox T-shirt, her short hair an auburn riot. She held his half-helm in one white-knuckled hand.

"I . . . was waiting for you."

"To do what? Take up sleepwalking? Do you have any idea how worried I've been? First I thought you'd mutated into a prick, and then I thought maybe you'd been kidnapped by corporate spies or aliens or something, and then I started having these visions of you lying in a ditch somewhere. *Where were you?*"

"I had a meeting with Laurence Bourbon—you knew that. He's given me a contract to sign."

"And that took until one A.M.?"

Beck felt as if all the air had been squeezed out of the room. "One. . . ? That's impossible."

"You wear a watch. Use it."

He did wear a watch, when he remembered to put it on. He pulled up his sleeve. Evidently this morning he had not remembered. He tilted the naked wrist so Marian could see it.

"The world is full of clocks, Beckett. Your car has a clock. Your computer has a clock. Your pager has a clock. This office has a clock, although it's damned hard to see in the dark. Are you telling me you didn't glance at any of them?"

"No. I didn't." How had time slipped away from him like that? How could he possibly have gone into the Sheraton at 3:15 in the afternoon and come out at—he hastily back-tracked, trying to calculate how long he'd been working on the First Continental project—10:30 P.M.?

Marian threw his half-helm into his lap. "I'm going back to bed. Now that I know you're not dead or kidnapped, I don't particularly care what you do." She turned and made a patented Marian exit.

"Marian . . ."

"You could have called," she slung over her shoulder.

"I'm *sorry*."

"You could have left a message on my pager." She was heading up the stairs into the loft. The trapdoor slammed.

The house was silent. Beck sat in the semi-darkness of his office, half-helm in his gloved hands, feeling singularly confused.

By morning he had a plan of action. He would make it up to Marian. He would woo her. He would win her back. It was Saturday and Beck took full advantage of it. He had the bakery deliver scones. He made strong Arabicus coffee. He cut roses from a convenient bush that hung over the wall from their neighbor's prize-winning garden.

Marian was surprised, pleased, and appeased. So much that when Ruby called to see if she wanted to go antique store hopping, Marian turned her down in favor of a weekend with Beck at a resort north of Marblehead. He effectively forgot about First Continental, Laurence Bourbon and his contracts, until late Sunday evening.

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* * *

There were three messages for him from Bourbon when he finally got back to his computer again. They all said the same thing: *Hope everything is all right. Have to return to New York Tuesday. Tied up all day Monday. Must meet Monday evening if you're interested in a book deal. Around eight, my hotel. Bring contracts; hope you'll stay late to talk revisions and programming. My apologies to your wife.*

Beck pondered his options, which were exactly one—he had to meet with Bourbon and complete the deal. Marian would just have to understand.

She did not understand. "His apologies? Why didn't he just include me in? Doesn't he want to meet your fabulous wife? What've you been telling him about me?"

"I haven't told him anything about you. I mean, nothing *negative*. He wants to pick my brain a little about programming. Something I know you find incredibly boring."

"Not boring—just mystifying. Programming is like . . . invoking ancient gods. You know—mumbo-jumbo, hoodoo-voodoo, open sesame, and a partridge in a pear tree."

"Fine, mystifying then. At any rate it's not something you'd—"

"And why do you let people take advantage of you that way?"

"Take advantage of me? Marian, the man wants to publish my book. He even wants to pay me for it. How in heaven's name could he take advantage of me? He has a little security problem, that's all. Some hacker's been into his e-mail, seems to know whenever J. R. Koenig turns in a novel; he snags it and publishes in on the Internet before it can get to press."

She whistled. She could do that. It was something he vastly admired; just now he found it annoying. "And you're so fascinated, you're going to give this guy free advice."

"We hardly need the money."

She shrugged and he read into the shrug all sorts of censure. "Did you ask about Ibrahim X?"

"He had nothing to do with that, personally."

"His house still published the book."

Beck got up from the sofa they shared and headed for his office. "I have some work to do."

"Avoidance tactic," she called after him. "That's cheap, Beckett. Really cheap. Ruby says—"

"I'm getting damn tired of what Ruby says," he muttered.

"I heard that." She got up and followed him from the room, something she never did during their rare arguments. But then, *he* never swore. "You *never* swear," she accused him. "What's gotten into you? And why this sudden antipathy toward Ruby?"

Beck flopped down in the chair behind his desk and rubbed the bridge of his nose. "I don't know what's gotten into me. I'm tired. I'm keyed up. I'm on the verge of maybe publishing something—"

"Well, hell, if publishing something's going to make you behave like a witch with sore tits, I'm not sure I *want* you to get published."

He looked at her, balefully, he

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hoped. He'd never looked at anyone balefully before, so his face wasn't quite sure what it felt like. "Maybe that's the problem, Marian. Maybe you don't want me to get published . . . for reasons known only to yourself."

She turned and left the room, leaving him free to make whatever late-night dinner plans he desired. He dropped Bourbon an e-mail at the Sheraton confirming the engagement, and dove into his government project files.

It was very late when he finally crawled into bed—or very early, depending on how one looked at it. He was frustrated. He wanted to be writing fiction, not noodling computer code, and the effort to keep his mind on his work left him irritable and sapped. Yet, when he'd switched to a piece of short fiction around one A.M., he'd quickly discovered that guilt was just as debilitating a disease as frustration.

He gave up at about 1:30 and rolled onto his side of the bed, perching there horizontally as if he were sleeping on the edge of a cliff. Marian did not, as was her habit, trespass onto his dream turf and he did not trespass onto hers. They slept the entire night on either side of an imaginary line that bisected their mattress with perfect parity.

She was gone when he awoke in the morning, having evidently risen before the alarm went off and disabled the system. It was a cheap and childish thing to do and made Beck ten minutes late for his first class. He was determined to get even, which was strange. Halfway through the afternoon, he realized he'd left his computer's memory core at home. That was also strange. He swore he'd put it into his briefcase just as he'd done every morning for the last five years, but it wasn't there when he opened the case, and in its place was a copy of *Voice from a Burning Bush*. Obviously Marian's work. Fuming further, he went home to get the core.

Ruby's car was in front of the house when he got there. His lip curled in distaste. He had always liked Marian's business partner, but lately he'd come to realize how much she reminded him of a pit bull in a Christian Dior suit. The image was funny. He was almost laughing by the time he entered the house through the kitchen door. The women were nowhere in sight, but he could hear their voices. Probably haggling over some piece of wallpaper—should the Feinmans have a nice rose pattern or Navajo white with a holographic life-scene? He slipped into his office and got the core from where Marian had left it in a potted plant; he caught the obvious symbology. God, but she was unsubtle.

Core in hand, he headed back out into the kitchen, reaching it just as Marian and Ruby did. The two women were lounging along side-by-side, arms about each other, eyes locked in an intimate smile. He stopped and stared at them staring back at him. Marian started to pull away from Ruby, but the other woman held her fast. Beck's blood felt like liquid nitrogen. This could not possibly be happening. Marian was completely and unrepentantly heterosexual. He'd have bet his life on it.

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"Hi, Beck," said Ruby, her brown eyes amused. "Fancy meeting you here."

"Oh, dear," said Marian, and put her hands to her mouth. Marian never said, "Oh, dear." "Oh, shit," maybe. "Oh, damn," maybe. But never "Oh, dear." What had this woman done to his wife?

"Wh-wh-what. . . ?" he stammered.

Ruby shrugged, glanced at Marian, then smiled—no, grinned—at Beck. "Caught in the act," she said. "Or nearly so."

Marian giggled and shrugged. "Sorry, Beck."

The tableau froze just like that—hung, like a bad piece of spaghetti code. *Reality.sys corrupted*, read a tiny monitor in Beck's head. *Reboot universe, Y/N?* Somewhere in the room, a persistent, rhythmic beeping started. *The microwave*, he thought. *Who turned on the microwave?*

Marian opened her mouth. "The time is seven A.M.," she said. "The time is seven A.M. Coffee has been brewed. Instructions?"

The scene dissolved in a foggy special effect and Beck found himself staring at sunlight filtering in through the sliding glass door that gave onto the loft's balcony. "The time is seven A.M.," the house repeated. "Coffee has been brewed. Instructions?"

Beck sat up, the dream clinging to the inside of his head like mildew. He shook it. A futile gesture. "Where's Marian?" he asked.

"Marian has left the house," said the house.

Which meant she was still mad at him. He thought about calling her, but did not. He got up, showered, dressed, ate a meager breakfast and went to school. After his second lecture, when he realized he had forgotten to bring his computer core, his stomach tied itself in a double granny. He would *not* go home. Instead, he called the house from a terminal in his office at the school and asked it to turn on his desktop and download the files he needed. On the verge of breaking the connection, he hesitated. Skin clammy, stomach protesting, he asked, "House, where is Marian?"

"Marian is home," said the house.

He hesitated long enough to have the house computer prompt him. "Instructions?"

"Is she alone?"

"No. Ruby Wilson is also in the house."

He cut the connection, checked the time and left the campus. Obviously his dream was, if not prophetic, at least a subliminal message from himself to himself about the state of Marian's relationship with Ruby. He, who confronted nothing that could be avoided, would confront them.

Marian's minivan sat in the driveway, its nether regions full of carpet and drapery samples. He rounded the house and cut through the garden, gliding up the back steps and noiselessly opening the kitchen door. "I don't believe it," he said.

The two women were seated at the kitchen table, coffee in hand, poring over the flat display of an electronic drafting pad. Their heads came up in unison.

Marian frowned. "What's wrong, Beck?"

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"How can you ask me that?" He gestured with both hands. "The two of you . . . together . . . here."

They exchanged a look. "And?" prompted Ruby. "What's unusual about that?"

"Nothing, now that I think of it. Dear God, you're always together like this. Why didn't I see it?"

"See what?" asked Marian.

"You two are lovers."

The two of them gaped at him, then Ruby threw back her head and laughed. When Marian joined her, Beckett turned and let himself out the way he'd come.

Beck, very pointedly, did not answer any communication from Marian for the rest of the day. He went downtown well in advance of his dinner appointment with Bourbon. To while away the hours, he availed himself of the hotel bar, got out a borrowed notebook computer and tried to write. He began drinking lattés around six, and had had four of them by the time Laurence Bourbon spotted him and came over to say hello. There was another man with him, a tall, thin fellow with an amazing tan and gleaming black hair, who he introduced as Zev Darren, an art director at Sefton.

They dined in Bourbon's suite, and Darren captivated Beckett with talk of book covers. After dinner, the art director was called to his computer to answer some urgent e-mail. Beck turned over his signed contracts to Laurence Bourbon.

"No questions?" Bourbon asked.

Beck, lounging in a futurist's idea of a recliner with a cup of cappuccino in hand, wagged his head, feeling remarkably relaxed considering the stress of the day and the sheer amount of caffeine he had consumed. "But I believe you had something to ask me."

Bourbon smiled. "Indeed." He leaned forward on his sofa. "This cyber-crook really has me baffled. Are there any traps I could lay for him—any lockouts I could devise—that would keep him from breaking and entering?"

Beck nodded and yawned. "I don't know if I can explain them to you, though."

Bourbon frowned. "Well, I am somewhat of a hacker, myself—an amateur, certainly, but I think I might understand. Still . . . could I record our conversation? What I don't understand, I'm sure one of our programmers could."

Beck agreed, and Bourbon got his recorder and popped in a tiny optical disk. He grinned in a way that belied his sophistication, the telltale hacker-gleam in his eye, and said, "I really appreciate this, Beckett."

In that moment they achieved rapport. Laurence Bourbon asked questions, and Beck answered them enthusiastically. It was easy stuff, but it got Larry (Beck found it easy to think of him as "Larry" suddenly) sitting on the edge of his seat. Beck felt like doing the same, but no matter how much internal enthusiasm he generated for the subject matter, he couldn't seem to get his body to reflect it. Zev Darren, he noticed, had no interest in hacker-babble. He had evidently finished with his e-mail and was im-

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mersed in a computer game, his face half hidden by a VR helm. Not unlike Marian, Beck thought, Darren obviously saw the computer as an entertainer. He leaned back in his chair and chattered on.

When he left the Sheraton sometime after midnight, Beck was tired but exhilarated. He had a contract in his pocket; his novel would be published within the next year. In the elevator, he paused to savor the signing, but found the memory imprecise and hazy. Despite the virgin daiquiris and cappuccinos, he'd come close to dozing several times during the evening; exhaustion had robbed him of his moment of glory. He blamed Marian, who, after all, had caused him to lose sleep.

Well, he'd sleep tonight—or rather, this morning. He checked his watch as he crossed the lobby: 12:22. Small wonder the place was subdued. He glanced toward the concierge. There was no one in attendance. There was no one in the lobby at all, in fact. He shrugged as the brass-and-glass doors slid open before him, and stepped out onto the sidewalk. It clacked back at him as if he wore taps on the heels of his shoes. He glanced down at his feet; the concrete gleamed a grooved black, like obsidian scored with a fine-toothed comb. He looked up. Gone was the city street, the cars, the buildings, the street lamps, the painted curbing, the traffic signals. There were, in fact, no intersections for traffic signals to preside over. The glossy surface beneath him curved away to the right and left in a flat arc and, while the Sheraton's bulk still loomed comfortingly behind him, the rest of Boston had vanished.

Beck could have fled back into the hotel, but he didn't; curiosity had gotten the better of more sensible fear. He moved forward, toward the center of the curving track and a circular red patch with a tall steel pole in the middle of it. As he crossed the odd tarmac toward the shaft, it occurred to him to wonder what light source allowed him to see either color or form. He could see none. The sky was an unrelieved, light-sucking black with not so much as a star to brighten it. Despite that, the shiny spindle gleamed softly in its field of bright, unambiguous red.

Heels in the black, toes in the red, Beck put hands on his knees and peered down. Letters stared back at him. The letters formed words and the words formed a recognizable phrase: THE PLANETS — Holst. The score, directionless, ambient, now oozed out at him from some unseen source.

Beckett Hodge straightened and gazed right and left. He was standing, he realized, on an immense record album. Not a CD or an OD, but a titanic, archaic, vinyl platter. He turned and made his way toward the outer edge of the record, discovering the source of the light. At the turntable's rim, softly glowing walls rose into a haze of ambient light. As Beck tried to decide whether he should have noticed this feature of the place before, the turntable began to move.

He allowed it to carry him along away from the familiarity of the hotel. He had come to the inevitable conclu-

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sion that he was asleep and dreaming, and that, dreaming, he was exploring his own subconscious. He knew a moment of intense embarrassment at the realization that wherever his mind was, his body was still in Larry Bourbon's suite in a shameful state of repose.

He was hearing "Mars," now and hummed along tunelessly, watching the glowing, featureless walls move imperceptibly by. *Curious. How can one know one is in motion if one cannot observe the evidence of motion?*

As "Mars" continued to play, Beck noticed changes in his environment. The album beneath his feet was now carrying him toward a golden hoop that protruded from the glowing wall some yards ahead at a height of about twenty feet. The hoop, like the walls, seemed to gleam with its own light. It was turned on edge, its open circle facing him. He thought of brass rings and carousels, which were not unlike turntables in their basic design. It was a consistency that both delighted and comforted him. Approaching the hoop, he wondered if he could manipulate the dream plane.

That train of thought derailed when he noticed a mist gathering around the golden circle. It seemed to issue from nowhere, surrounding the ring, flowing through it, then lowering itself toward the turntable. Obvious symbology. His particular brass ring was the book contract he had just signed; the mist was something that attempted to obscure it from him.

As he was pondering the mist, the turntable slowed perceptibly and a wire basket filled with soccer balls appeared to his right along the wall. Beck started to analyze exactly how the basket had appeared and what it might mean, then decided, instead, to accept the playful nature of the dream. He reached into the basket as he passed by it, fished out one of the balls and lobbed it through the hoop, expecting to miss. As this was a dream, he did not miss; the shot was perfect, soaring through the ring without touching any part of its gleaming rim. If only he might have done that in high school.

Beck laughed and turned to get another ball. The basket was gone. A tone sounded—like a crystal goblet struck with a mallet. Overhead, the mist sucked away into the noplace it had come from and the hoop went dark. The turntable picked up speed. Beck knew this without knowing how he knew it. There was no breeze, the walls gave up nothing but diffused light; he simply knew.

Another ring appeared high on the curving wall ahead. A basket of balls awaited his approach. This time, the turntable didn't slow, but continued on at a leisurely pace. Beck snagged a soccer ball and put it through the hoop with pinpoint accuracy.

Perhaps it was the sixth hoop or the seventh at which Beck decided he no longer wanted to play. He was bored and the turntable was moving more briskly; he wasn't convinced he could make the shot. He wasn't convinced he cared enough to try. He approached the hoop, lazily dribbling the soccer ball off the grooved surface beneath his feet. When he had by-

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passed the point at which he usually threw, the turntable slowed. He continued to dribble the ball, glancing toward the center of the record. The cut was "Uranus." He could no longer see the spindle.

Movement above him drew his eyes back to the great golden ring. The vapor that had surrounded it seconds before was sinking toward him. An icy cold prickled over his skin. The vapor was malevolent; he was absolutely certain of it. Not poisonous, not toxic, but *malevolent*. In the instant it touched his face, he loosed the soccer ball, hurling it in a soaring arc through the golden hoop. The vapor was gone in a breath, leaving behind the irrational conviction that it had almost sucked his soul out of his body.

He did not tempt the vapor at the next hoop or the next. He sent the soccer ball through unerringly, still uncertain how a man for whom sport was torture was able to do such sporty things. As the bright ball cleared the ninth hoop accompanied by the strains of "Pluto," the world around Beck changed. The turntable glided to a halt and to his right, in the curving wall, a doorway spilled light out onto the grooved, black plane.

Beck glanced around. *Pluto*. Unlike the others, this cut was oddly disturbing. Beck had little time to decide why. As he hovered in the open door, all light disappeared from the turntable as if sucked up by a vacuum. He stepped through the door.

He stood in a corridor, at the end of which he could vaguely make out a staircase. If he recalled his Freud correctly, climbing that would be symbolic of having sex. He wondered if the nights without a willing Marian were beginning to take their toll. He chuckled. The hoops and balls would no doubt also count as expressions of sexual desire in Freud's book. How wonderful and complex was the language of dreams.

Before him the floor of the corridor lit up. It was a simple pattern of blue-and-white tiles that seemed to be pulsing in a random sequence. He stared at the checkerboard momentarily. It brought to mind his grandmother's kitchen floor. A floor on which he used to play his own peculiar version of hopscotch. As he recalled, grandma's kitchen floor hadn't blinked on and off.

Another memory was invoked, oddly, of an episode of *Dr. Who* in which the good Doctor(s) (five of them, as he recalled) was confronted by such a puzzle. It had been booby-trapped with a laser beam that would zap anyone unwary enough to wander onto the wrong square. Beck crouched to watch the play of light across the tiles. The Doctor's solution to the puzzle had lain in computing the value of *pi*. He rose. *Pi*. There were nine rows of tiles. 3.14159 . . . The digits couldn't stand for *rows* of tiles, but they might stand for *columns*.

In the first row of tiles, a white lit up, three tiles from the left edge of the checkerboard. Beck moved to stand in front of the tile and waited. When it lit up again, he stepped on it. A tone sounded, the tile blinked several times in rapid succession and

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then stayed on. He looked down at his feet. There was just enough room for both of them on the tile.

"OK," he said aloud. "I'll play your silly game." He watched the first tile in the next row for a flash of light. When it came, he missed it, because the tile was a deep blue. He waited nearly a full minute (or so he thought) until the square lit up again. He stepped on it this time and was rewarded as before with the tone. As the first, the tile stayed lit.

It was easy after that—merely a game of waiting and leaping. In due time, he found himself in the very center of the corridor. There the pattern made an abrupt change. Both feet on a tile of blazing white, Beck stared in consternation at the floor ahead of him. From where he stood to the suddenly distant staircase, the tiles formed an expanse of strangely patterned brown and muted gold. Here was a group of three gold tiles, here a group of two, here a single tile. The squares themselves were smaller, too, leaving room for only one foot at a time to occupy them.

Recognition made Beck chuckle. He'd viewed similar patterns of tiles in myriad public men's rooms. He waited, but none of the tiles before him lit up. After a moment of study, it seemed to him that the gold tiles did seem to form an irregular, but navigable, path from here to there, if one had a reasonably long stride and was willing to play hopscotch. The only problem was the size of the squares. Dreamer's instinct told him that stepping over the edge of one was a Bad Thing.

He was contemplating his first move when he noticed a slight dimming in the corridor. A glance over his shoulder revealed the reason—behind him, the lighted tiles were winking out, darkness marching toward him. He had the creeping feeling that it would not be very pleasant to find out what happened when the square he was standing on went dark. He glanced ahead. About three feet away was a set of two gold tiles set about two feet apart. Not a bad split. He leapt.

He landed, the "reward" tone sounded and the gold squares beneath his feet blazed with brilliance. At that moment, he realized he was wearing sneakers instead of the black leather ankle boots he'd started out with. His dream was nothing if not accommodating. Pleased with himself, he made another selection and hopped again. The third leap was harder, leaving him teetering on one foot. In searching for his next landing pad, he lost his balance and toppled forward, only barely managing to land with his left foot on one square and his right hand on another, his opposite arm and leg flailing for balance. Gingerly, he moved his free foot to the square where his hand rested. He came close to falling again, but somehow managed to keep his balance and work his way upright.

He now saw the wisdom of plotting his moves in advance. He negotiated the remainder of the corridor in carefully planned hops, skips and jumps. The pattern took an interminable amount of time to complete. Beck was glad he was dreaming; in real life, he'd be close to collapse.

From the bottom of the staircase,

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he took a look back at the field of tiles he'd traversed. The golden tiles, now ablaze, seemed to form a stylized question mark. As he watched the tiles began to dim, just as the previous set had done. He turned his attention to the next obstacle—the staircase.

It was of aged-looking wood—mahogany, Beck guessed. It even smelled of age, the incense of mildew and ancient varnish. It was a pleasant odor and it reminded him forcefully of his childhood. A wash of reminiscence came, giving the staircase a time and place in Beck's existence. Like the checkered kitchen floor, this came from his grandparents' house in Swampscott.

Finding his grandparents' staircase in a dream tickled him. He'd loved that staircase. It had given him hours of pleasure as he practiced climbing it without making a sound. This was difficult at best, for the stair was full of the creaks and moans and complaints of advancing age. He paused a moment to savor the memory, trying to recall the formula that would take him safely to the second-floor landing, for to call forth sound from the venerable beast was to loose gremlins in the house that would swarm the stair and carry little boys off to "bedlam."

Grinning, Beck began the climb. Center tread, far left, far right, step on the knot hole, skip two by climbing the banister, right of center, center, leap to the landing.

"Ha!" Beck exulted and turned back to give the staircase a triumphant glance. It had been replaced by a slick expanse of oily-looking metal. A slide. A means of escape? A pitfall? Bemused. Beck checked his forward trail, which opened up, not into the second floor of his grandparents' house, but into a sunny meadow of waving ultra-green grass, teeming flowers and chirping, Disney-esque bluebirds. The sky was at once pink and blue, the sun literally smiled down at him, and clouds looked very much like cotton candy. Such scenes populated uncounted refrigerator doors.

A circle of woodlands surrounded the place, tiny, bright orange fruit fairly glowing amid the dark foliage of hip-high bushes. *Clown noses*, Beck thought, and was struck with the absurd image of clowns skipping through the woods picking baskets full of noses. *Picking their noses*. The pun doubled him over with laughter. And Marian said he had no sense of the absurd.

He wondered if he could bring her here, tried and was rewarded with a "moo." He straightened. Aside from the overly cheerful birds, the meadow was populated by exactly one black-and-white cow which munched the terrifyingly green grass ruminatively, as it gazed at him through immense, chocolaty bovine eyes. A bright golden cow bell hung from a blue cord around its neck. This was not Marian. There was nothing remotely bovine about Marian.

OK, Beck thought. *I'll bite.* He walked over to the cow, scaring up a score of the bluebirds. They circled and chirped like something out of an old Warner Brothers cartoon. "Hello," he said to the cow, because after all, dreaming is no excuse for discourtesy.

The cow gazed back, opened her

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mouth and said, "Watch this." She proceeded to rise up on her hind legs, produce three of the outrageously orange fruit, and juggle them. She was actually quite good, Beck thought.

After about thirty seconds of juggling, the cow caught one orange globe between her front hooves, then snapped the other two out of midair and gulped them down whole. She came back to all fours, belched and shook her head, ringing the golden bell. "What did I just do?" she asked. "You have thirty seconds or four guesses, whichever comes first."

"Isn't that supposed to be three guesses?"

"That's wishes. Three *wishes*. Do I look like a genie?" She didn't give him time to answer. "First guess."

"You . . . juggled clown noses?"

"Wrong. Three more guesses. Fifteen seconds."

"Oh, sorry. Tangerines. You juggled tangerines."

"Is that your answer? *Juggle tangerines?*" She rolled her eyes. "Wrong again. But you're getting warmer." In the cotton-candy clouds over the cow's piebald head, a slot-machine face appeared, its rollers spinning like crazy. The one farthest to the right stopped, showing the word "tangerines." He assumed that he'd score a jackpot if he got the right answer. It occurred to him to wonder what he'd score if he *didn't*. "What happens if I don't guess the riddle?"

"You lose."

"And then what?"

"You're out."

"Out. Out of the dream, you mean? I wake up?"

"What makes you think you're asleep?"

"The fact that I don't usually hold conversations with spotted cows in Technicolor meadows or watch them juggle clown noses."

The cow sighed. It was a deep sound and seemed to issue from her voluminous belly. "Do you need a clue? I'm allowed to give one more clue."

Beck nodded.

"Watch." The cow turned her brown eyes on the fringe of woodlands where a man in a pith helmet and bush outfit carefully stalked something among the foliage with a large, cartoon butterfly net. Beck couldn't see what he was pursuing so raptly. He started to ask the cow, but she shushed him.

The hunter tiptoed up to one of the bushes, then leapt forward with a cry and took a swipe at it with his net. Two of the orange globes fell into the webbing. He swiftly scampered away with them. The cow turned her increasingly mournful eyes back to Beck. "Well?"

"He, um. Shoot. Ah, capture . . . net . . . um . . ." Beck opted for the literal approach. "*Bushwhack* two tangerines?"

In the slot machine another window braked to display the number "2." "Ooh," said the cow. "Close, but no cigar."

"What's close?" Beck asked, but the cow merely looked away across the meadow, toward the bushes. "Bushwhacked was close?"

She sighed again, jiggling her udder.

The answer came to Beck with the

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sudden recollection of a story a colleague had told him about the strange combinations of words her students would produce during classroom exercises in a language class she had taught. He knew it was the answer—it was his dream, and his own memory had provided it. "Ambush two tangerines," he said. Overhead, the final bar rolled into place and a loud bell sounded.

"Fuck it, I quit," announced the cow, and disappeared along with the pink/blue sky, cotton candy clouds and clown-nose bushes. In their place the violently green sward sprouted a graveyard complete with ravens, crows, ornate listing headstones, and a gleaming white mortuary.

Beck was momentarily taken aback. Why a graveyard? He'd answered the riddle correctly; why this presentiment of doom? The place was eerie, but familiar, and he felt more memories pressing for release. He made his way to the mortuary.

The foyer was empty. He moved into a display room where a fleet of new caskets were arrayed, tops open like convertibles in a car lot. On the opposite side of the display room, he could see the steel-and-glass doors that led to the nether realms. He certainly hoped his dream journey wouldn't take him there.

He turned and peered across the foyer. A chapel—the carved wooden doors bore a representation of the Solar System—nine planets arranged around the central Orb. Each planet was engraved with a religious symbol: a Star of David, a bowl of fire, a lotus, a cross, an Evam, a yin-yang, a five-pointed star, a star and crescent, a nine-pointed star. He moved to the door, put his hand on the handle and pulled. It was locked. He glanced at the Solar System again. The planets, with their religious symbols, were out of order. Another puzzle. After a moment of thought, Beck rearranged the planets in their engraved orbits—beginning with Mercury and its nine-pointed star, and ending with Pluto, bearing the Evam. *Pluto*. The ninth planet was Pluto. But it hadn't been discovered when Holst wrote *The Planets*—the music he had heard on the turntable, he suddenly realized, was a symphonic rendition of the Mickey Mouse Club theme, music Beck had always associated with the immortal rodent and his dog. Nine planets, nine religious symbols, nine hoops, nine everything.

Teetering on the verge of recognition, Beck entered the chapel. At the altar in front of a closed and locked casket stood a clown in a black suit. He had blue hair, a tangerine nose and a pair of red, floppy shoes that looked incongruous with the natty attire. His face bore a half-mournful, half-manic expression. When he saw Beck, his bright red lips stretched into something that bore a closer resemblance to rigor mortis than a smile. He produced a clipboard out of the ether.

A manic-depressive clown, Beck thought. *Oh great.* Clowns had never amused him as a child. They had given him the willies. He now realized they *still* gave him the willies. He'd often thought they'd make ideal scarecrows—or rather "scarekids"—for people who had flower beds or pools

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they wanted to keep the neighbors' progeny out of. He steeled himself and went to the altar to confront the clown-mortician.

"You are. . . ?" the clown asked lugubriously.

"Beckett Hodge."

"Beckett Hodge, you must answer four questions for me, before you may proceed."

Beck nodded, not at all sure he wanted to proceed. Right now what he really wanted was to wake up, even if it meant having to go through the embarrassment of explaining to Laurence Bourbon and Zev Darren why he'd fallen asleep in the middle of a conversation.

"Listen carefully," said the clown, "and finish this sentence." He glanced down at the clipboard and read: "Touch not the cat—"

"But with a glove," said Beck automatically.

The clown smiled and checked off something on his clipboard. At the foot of the casket, a latch popped open. Beck jumped.

"Now," said the clown, "complete this: He was like a giant on dry land—"

"And . . . and like a silkie in the sea." Another check mark was drawn, another latch popped open and an icy shaft of recognition speared Beck's brain. He knew these sequences. And he knew them for reasons other than their association with childhood games or television shows he had watched.

"By the prickling of my thumbs," the clown read.

Beck backed away from him. Memories had been converted to binary expressions and coded into a targeting series, and eight pattern-matching sequences.

"By the prickling of my thumbs," the clown repeated.

Memories had built a nine-level security system for the DOD.

Beck turned and fled.

Behind him the clown said tonelessly: "Abort. Restart sequence. Touch not the cat—"

The graveyard metamorphosed as Beck crossed it, back into a meadow full of bluebirds, butterflies and tangerine bushes. The cow did not look up as he flew past her, but he thought he heard her say, "Abort. Reset."

The meadow had faded by the time he reached the top of the staircase/slide. It was still a slide. He threw himself down it, landing at the bottom on his behind. Scrambling to his feet, he confronted the corridor of tiles. Both sections of the course were now just ordinary-looking floors. He took them without so much as a hop, skip or jump and came out onto the giant turntable. It rolled away and to his right, inexorably. If he was where he thought he was, the situation demanded that he exit this scene just as he had entered it. While the eight pattern-matching segments of the program were reset upon completion or exit, the initial nine-layer "hacker trap" was not. It could be tripped as easily by a clumsy exit as it was by a clumsy entrance. Beck had no desire to find out what it meant to be caught by his own fail-safes.

He stepped out onto the turntable. Not content to let it simply carry him along, he trotted along with the rota-

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tion, eyes open for the hoops. His mind churned. How the hell could he be here? Was this a drug-induced dream, or was it more real than that? Was it being monitored? The image of Zev Darren playing a VR game in the corner of Bourbon's suite came to him with the force of a blow. Could that be it? Could he literally be *inside* the DOD program? He had constructed the DOD scenes with specialized programming Gear—had seen them as programming objects. But interpreted by a VR system—provided one could be made compatible—with his own imagination in control. . . .

He shook his head as if that might rattle some answers loose from the inside of his virtual skull. The Who and the Why were obvious, the How conceivable. The question was: what would prompt a fiction editor and an art director from a major publishing house to get involved in terrorism and espionage?

He hurried to the first basket of soccer balls and hurled one through a hoop before the Ghost routine could intercept him. Timing. This part of the program was all timing. He worried that he might do better if he didn't know what those bright hoops and balls represented: clever traps and one-way viruses that would backwash into the inept hacker's system—in this case, his mind. Beck chafed as he negotiated the nine hoop stations, returning at last to where he had entered the program.

The "Sheraton" stood alone on a barren corner, symbol of Beck's connection with the real world—a world where Laurence Bourbon and Zev Darren waited for him to unlock the gates to hell.

He stood inside his own creation—a creation where virtual cows juggled tangerines and where manic clowns presided over coffins full of death—and pondered explosive things. What he needed was a break program that would shatter the external connection—a virtual bomb. He floundered for a moment, trying to decide how to create a bomb in this impossible universe. Then he laughed at himself. Impossible it might be, but it was *his* universe and ultimately obeyed his divine decree.

He patted the breast pocket of his suit. His wallet, a pen, his pager. He took out the pager and examined it. It was as much a computer input/output device as his keyboard or Gear. He thumbed it on and started to speak into it. But wait—what if his words were audible to those who had put him here? He had to take the chance, he supposed. He held the pager to his lips and whispered. "Break routine . . . uh, 'Sheraton.' Delay fifteen seconds from activation. Activate on command 'destruct.' Routine: Induce general protection fault at address . . ." He glanced up at the corner of the hotel and almost grinned—a bronze plaque gleamed dully on the virtual wall. "Address 008D:0015."

Fine, but that might not be enough. The system had three overt inputs, two covert ones. Five in all. Two of these were set up for Gear protocols. His vicarious hackers could be using either, but if he shut down both, the system alarm would engage, which could cause . . . well, panic for one

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thing. A military panic was not a pretty thing. He'd have to make a choice. The covert link made the most sense. It would be accessed at the installation only in an emergency, so the hacker-spies could expect little chance of interruption. Beck completed the routine with a fatal interrupt to the covert Gear device, wondering how long he'd been here and if Marian had tried to reach him.

He entered the virtual hotel lobby cautiously, as if Bourbon or Darren could be expected to pop out of nowhere to intercept him. He didn't think they had the technology to do that—to enter this dream world completely—and doubted they could even monitor him precisely. He wondered which of them was the programmer. Maybe they both were. Maybe neither of them had anything to do with publishing. But then how had they intercepted his manuscript? He remembered what Bourbon had said about novels being lifted electronically off editors' desks. Had that happened to his?

He moved directly to the elevator core, chose the center shaft and punched the "up" button. The doors slid apart. "Destruct," he told the pager, lobbed it into the elevator car and ran, thinking of Marian. He was still thinking of her when a flash of blinding light enveloped him and lifted him into the non-existent sky.

"I thought you weren't speaking to him," Ruby said.

Sometimes, Marian thought, *Ruby could be impossibly dense.* "Not speaking isn't a synonym for not caring, Rube. It's two A.M. He hasn't answered his pager and Mr. Bourbon hasn't answered his phone."

"So, they're out celebrating the book deal."

"Until two A.M.?"

Ruby shrugged. "Why not? We're commiserating over his thick-headedness until two A.M."

"You don't know Beck the way I do. He would *never* stay out so late without calling me. Even when I know his schedule and he *knows* I know his schedule, he calls."

"Uh-huh." Ruby sipped coffee, steam coating her glasses. "Even if he's not speaking to you?"

"*Especially* if he's not speaking to me. Then guilt takes over. He *has* to call." She got up and headed for the kitchen, leaving Ruby camped in front of the fireplace.

Ruby sighed volubly. "Shall I lock up?"

"Whatever." Mentally, Marian was already on the road, already pulling up to the Sheraton, already leaving her car in the hands of a bleary-eyed valet. Already on her way through the lobby to the elevators.

Fifteen minutes later, when she actually entered the Sheraton's spacious lobby, she had to take a detour to the concierge—she had absolutely no idea which room Laurence Bourbon was in. As it turned out, he was in one of the Tower suites and would have to issue an invitation to her if she was to go up. Marian decided a good lie was in order.

"My husband had an appointment with Mr. Bourbon this evening and he forgot his heart medicine." She scrab-

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bled in her fanny pack and produced her own pill case, full of stress tabs, vitamin C and Midol. "He didn't expect to be this late. He should have had one of these hours ago." She knit her brow and let her voice sound very slightly frantic.

The concierge called a rather muscular bellman to escort her up (as if she might possibly need to be overpowered). The elevator ride was silent. Marian looked at the ceiling of the car—stained-glass, it clashed with the once-upon-a-time *moderne* decor of the lobby. The broad corridor that gave onto the Tower suites was Queen Anne. What *could* they have been thinking?

"He's stuck."

"He's what? What do you mean, he's stuck?"

Zev Darren turned away from his monitor and pointed at the flashing cursor, which had sat for the past forty-five seconds in the same place in a crude but colorful maze. "Check his pulse rate."

Bourbon glanced at the tiny screen that displayed Beckett Hodge's vitals. "It's up."

"He's stressed over something. He may be having trouble with the last stage. Sometimes programmers put randomizers into their routines—sort of a *code du jour* thing. He may not remember all the different sequences. Damn." He watched the cursor a moment longer. Watched it until it abruptly blinked out. "Oh, shit."

It was like something out of a James Bond movie. As Marian knocked repeatedly on the door of Bourbon's suite with no result, someone within the suite howled. Having no pass card, the beefy bellman opened the locked door with his foot. Marian flung herself through the door. She was hardly prepared for what she saw—Beckett, strapped to a chair, VR Gear on head and hands, with two men hovering over him. One had his hands on his shoulders and was shaking him hard enough to make his teeth rattle.

Marian's female instincts kicked in. "You sonofabitch! Get your hands off my husband!"

Lawrence Bourbon obeyed without hesitation, while his partner reached for a gun lying holstered on the sofa. The bellman was having none of it.

When he woke, Beck was surprised to be alive and in a hospital room. The room was under military guard and, besides Beck, held two occupants. Marian and Colonel Traynor chatted quietly in one corner. He cleared his throat, drawing their immediate attention.

"Bourbon?" he croaked.

Marian, her eyes still showing concern, afforded him a lopsided grin. "A little early for the hard stuff, isn't it?"

He shook his head; his brain wobbled. "I mean—"

"I know what you mean. He's in military custody, courtesy of your ferocious and quick-thinking wife and a burly bellman named Frank. And he'll stay there for awhile too, thanks to Colonel Traynor and his buddies in the CIA."

Beck's eyes shifted automatically to Traynor's face. The movement hurt.

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"They-they—" He choked, prompting Marian to give him a sip of water. Throat wetted, he ploughed on. "They linked me to the ICBM security system using some kind of specialized VR rig. They wanted me to crack it for them—my own code. . . ."

The colonel was nodding. "Yes, we suspected as much when we saw the system. It was . . . tremendously sophisticated. We had no idea a high-end 'off-the-rack' system could be modified to that extent."

"But why? An editor and an art director? Why?"

"Money. But people aren't always what they seem. Oh, Mr. Bourbon is an editor, all right. A minor, poorly paid line editor. But Zev Darren is no art director. He's a computer expert lately in the employ of Shalom/Salaam and Ibrahim X. In simple terms, a terrorist."

Beck glanced at Marian. She was looking away, her face wearing the patented Marian Whaley-Hodge "Itoldyouso" look. The blood drained out of his head. If he hadn't been lying down, he would have swooned. "Ibrahim X?"

"Bourbon line edited his best-selling manuscript," said Traynor. "Mr. X evidently felt his position in the publishing industry could be advantageous. Unfortunately, he was wrong; Bourbon was a poor choice of accomplice. Zev Darren is a professional mercenary, at least in the realm of hacking, but Larry Bourbon is only a greedy amateur. The threat of a treason charge rattled just about everything loose. Your editor friend got swept up in the romance and intrigue of it all. He simply wasn't prepared to be caught." He gave Beck a sideways glance. "Honestly, professor, how close did they come to breaking it?"

Beck wetted his lips. "Too close. I was deep inside the program, at the last security protocols, when I realized . . . sort of . . . what was going on—that someone had set me up to breach my own program."

The colonel's alarm showed as tiny white brackets on each side of his mouth. "But you stopped them. I assume you recognized your code."

Beck closed his eyes. "No . . . I recognized my childhood."

"Excuse me?"

Beck smiled wanly. "You would've had to be there."

Later, with Traynor gone, Marian sat next to him on the bed and held his hand. Her scent struck him softly. He opened one eye. "You were right, all along. Bourbon *was* connected to Ibrahim. In ways I couldn't have imagined. I seem to have an imagination deficiency. Not a good thing for a guy who wants to write science fiction."

"What was it like in there?"

"Weird. Like being in a dream. Or down a rabbit hole. But it was *my* rabbit hole—which is why I finally recognized the . . . the programming. It was all from my childhood. Games I played, shows I watched, pictures I drew, riddles I made up. Patterns in floor tiles, staircases, cow pastures. But it was the clown. The clown in the funeral chapel. That was what did it."

Marian grimaced. "Imagination deficiency, huh? Hell, I'm not even going to ask."

"Aren't you at least going to say, 'I told you so'?"

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"Do I need to?"

He shook his head. A sigh, deep and silent, broke over him as a realization struck.

Somehow Marian heard it and squeezed his hand. "What?"

"The book. Sefton never really wanted the book."

"Maybe they did, and it gave Bourbon a legitimate excuse to contact you."

"Maybe. But it's more likely I got duped. I let my naiveté compromise the secrets I hold for my government." He closed his eyes again. "But the worst thing is what they led me to believe about you and Ruby. I think they must have drugged me, planted suggestions in my head that I couldn't trust you . . . and other things. They wanted you out of the way, I guess."

Marian's mouth curled. "So, that's what that was about. And that was worse than almost giving away the deed to Uncle Sam's farm? Sweet, but silly, Beck. There was a hell of a lot at stake in those silos. On the bright side, I think this little episode has given Colonel Traynor and his fellows reason to consider an alternative to hiding loaded guns."

Beck looked out the window where the Sun had risen on a brilliant day. "Funny. I guess I turned out to be a secret agent after all. So secret, even I didn't know it. Secret agent double-oh-one—binary spy."

"You could write a book about it."

"Yeah, I could. But, who'd buy it?"

There were, in fact, several publishers standing in the electronic queue in Beck's e-mail box when news of the virtual break-in surfaced and Ibrahim X was arrested on charges of masterminding it. Beck had his pick of offers, his shiny new agent finally accepting the high bid from a large publisher most widely known for its techno-thrillers.

Beck was pleased, without being ecstatic. He had a book contract, but it was non-fiction—just one more real-world title on cutting-edge programming by Beckett Hodge, destined one day to reside on the shelves of universities and computer super-stores everywhere. Still, given the sensational nature of the subject matter, it would almost certainly arrive there by way of the *NYT* bestseller list.

At least that was the picture until the Pentagon intervened in the form of an apologetic Colonel Traynor, who appeared in the Hodge living room one evening and parked himself in Beck's favorite chair.

"I'm sorry, Professor Hodge, but we simply can't allow you to publish this book. It would reveal too much about our security system and its . . ."

"Vulnerability?" Marian suggested.

"I was going to say, its nature."

Beck didn't care what he had been going to say. All that registered was that the brass ring had dodged him once again.

"But if you prevent it from being published—" Marian objected.

"The public would suspect a cover-up," Traynor finished for her. "And they'd be right. That's why we're willing to allow the book to be published provided two conditions are met."

Beck raised his head. "Which are?"

"First, that it be published in a vast-

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ly altered form. You would have to fictionalize the account. Change names and circumstances, alter the order of events, make up different riddles."

Amazement settled on Beck like a woolly cloud. "But anyone who followed the news would know—"

"Ah, no. You see, that's the second condition—you have to wait."

"Wait? How long?"

"Three years . . . or the length of time it takes for you to completely redesign your security system."

Beck sagged back into his chair. "Completely?"

"You'll have to design *two* new systems, actually—one for the warheads and one for the delivery system . . . which we've decided should be separated by . . . some distance."

"But in three years, there may not be a publisher still interested in the story."

Traynor shrugged. "I'm afraid that's the only recourse you have, Professor Hodge. We simply can't allow the story to be published now—not even as fiction."

Beck nodded. He was still nodding when Traynor was gone.

"You should be happy," Marian told him. "They're unloading the 'gun.'"

"I suppose I should be, but I just feel . . . exhausted . . . and silly. I was so taken in by Bourbon and his flattery. What made me think I could write fiction? Terry Lance was right; I should stick to what I know."

Marian made a rude noise. "Terry Lance is a textbook jockey. He wouldn't know good science fiction if he had a close encounter with it. Besides, you *did* write fiction. You just wrote it into the national defense system."

Beck had to laugh, and Marian, who didn't need to be told why he was laughing, laughed with him. The irony was delicious: He wrote fiction like a programmer and programmed like a science fiction writer.

Mentally, he was still laughing when his head touched the pillow that night. He didn't know if he could convince a publisher to wait three years for the story—especially a fictionalized version of it—but he did know he would continue to write both programs and fiction. Eventually, he would get them straight. ■

MOVING?

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The Sword of Mary, Esther Friesner, White Wolf, $5.99, 449 pp. (ISBN: 1-56504-936-5).
Distress, Greg Egan, Harper, $21.00 (hb), 343 pp. (ISBN:006-105-2647).
Axiomatic, Greg Egan, Harper, $13.00 (hb), 368 pp. (ISBN:006-105-2655).
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The Widowmaker Reborn, Mike Resnick, Bantam, $?, ? pp. (ISBN: 0-553-. . .).
Solo Flights Through Shared Worlds, Mike Resnick, Dark Regions Press, 172 pp., $19.95 hc (ISBN: 1-888993-00-6), $9.95 tp (ISBN: 1-888993-01-4).
First Dawn, Mike Moscoe, Ace, $5.99, 280 pp. (ISBN: 0-441-00392-3).
Godmother Night, Rachel Pollack, St. Martin's, $24.95, 357 pp. (ISBN: 0-312-14606-X).

Last February, I gave Esther Friesner's *The Psalms of Herod* effusive praise and promised you a sequel. Here it is: **The Sword of Mary**, just as marvelous, just as ironically biting, and ending on a note of triumphant, fist-in-the-air feminism.

Friesner began by positing eco-catastrophe, the "hungering times," and a recovery that included a change in the reproductive physiology of women (they became matable only every six months). The society that grew up around this change treated women as commodities who owed men "the kiss and the sign" on demand, turned men into beasts who warred to be "alph" (alpha ape or top dog), and used infanticide as a standard tool for adjusting population to food supply. It also rewrote scripture to make Herod a hero for his slaughter of the innocents (to ensure food enough to feed the baby Jesus). The earlier book gave us Rebecca of Wiserways Stead, a throwback to the times of monthly menstruation (and hence doomed if caught), a rebel against violence to child and woman, a fugitive who acquired a Jew for a true love and sought the magical City where everything was surely right.

As *Mary* opens, Becca and Gilber Livvy are entering the city to discover

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a strange place where people do not live by familiar rules. Yet rules they have in plenty, and practices that are quite as inhumane as anything on the Steads. Wait till you see how the City treats its surplus children, or how it ensures sexual relief for its men even as it sneers at the primitiveness of kiss and sign, or how it treats homosexuals. The victims are visitors who unwittingly transgress, babes rescued from exposure on rural Golgothas, and residents such as Van, heir to the chief of a clan supposedly devoted to justice yet just as unjustly victimized as any babe or woman.

Becca can hardly wait to leave with Gilber, but he has a mission of his own, to learn that his tribe in the distant mountains suffers from inbreeding and gain recruits to refresh his people's gene pool. Becca's rebelliousness must lead her to the brink of doom and earn her the worship of an underclass before they can escape by the skin of their teeth, riding on what may be the mechanical equivalent of a donkey.

What does the title mean? You suspect while Becca is still in the City, but you are wrong. Only on the unwilling return to Wiserways Stead do you learn that a woman's weapon is far less that raised feminist fist than it is her children—even her dead ones.

Unfortunately, Friesner does not really deal with the dilemma at the heart of her world. Its brutal infanticide was a response to the habits of reproduction that led to the "hungering times." She is properly appalled at the cost in lives and pain, but her solution does not seem to offer an alternative that will keep the "hungering times" from returning. Perhaps she believes that the empowerment of women will do the job; in that she is not alone.

Despite my cavil, this one I strongly recommend. Don't you dare miss it.

It's about time Greg Egan's **Distress** appeared in this country. First published in his native Australia in 1995 (under Orion Books' Millennium imprint), it is perfect fare for *Analog* readers. Andrew Worth, hi-tech journalist, has just finished a big story on biological "frankenscience." Offered a new bio assignment—the emerging disease called "Distress" for its severe and fatal psychological symptoms—he opts instead to bump a less senior fellow from her comfy coverage of Nobelist Violet Mosala, scheduled to announce a new "Theory of Everything" at a physics conference on the novel island of Stateless, built with unlicensed bioengineering.

Of course, what he finds is anything but comfy. Even TOEs have protestors, and some of those protestors seem to think that whoever first figures out the true underpinnings of the universe will in some way, at the moment of the figuring, create that universe. Some potential TOEs they approve of. Some they don't. And they do believe in direct action.

So do the companies from whom the technology that built Stateless was ripped off. Before long, Worth is in quite a mess, brewed of his own guilt over how he treated his colleague, the fanatics killing off physicists and bystanders, and an invading army bent on making the world safe for intellectual property and profit. And

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Distress of course comes back into the picture—but not in a way you will expect unless you peek.

This is thoughtful and inventive, very much out on that edge where science begins to look like magic, strong on characterization, and very satisfying. Don't miss it.

And watch for his collection, **Axiomatic**, which should be out by the end of the year. It offers eighteen short stories, two of them new, four of them from *Asimov's*, eight from *Interzone*. Good reading, every one of them, and very indicative of Egan's immense talent.

If anyone today deserves the title of Grand Old Man of Science Fiction, it has to be Jack Williamson. Born in 1908, he published his first story in 1928, and he's been writing ever since (in the 1950s and 1960s, he finally picked up college and graduate degrees and spent a couple of decades as an English professor). He's written his share of seminal stories, and if he is never anointed one of the Immortals on literary grounds, he's trying hard to make it on longevity.

His latest is **The Black Sun**. The premise is a space drive based in quantum physics: launch involves converting the spaceship and its contents into a virtual wave which leaps into space at light speed and is converted back into solidity when—*if*—it comes near a suitable concentration of mass. It is impossible to pick a destination; it is also impossible to return. Each launch is a crap shoot, but that has not impaired Project Starseed's ability to recruit volunteers to take their chances on finding a new home for humanity. The project's goal was 100 launches, but graft and corruption have cut it short at No. 99.

Now meet Carlos, poor Mexican dreamer of stars, good with computers, heartsick as he huddles at the project's gates with the protestors who want only to shut the project down. Someone hands him a set of worker's coveralls and tells him maybe he can stow away.

Meet Jonas Roak, nasty specimen, hired to infiltrate and, at the last moment, plant a bomb on No. 99. Meet Herman Stecker, Mission Director, chief grafter, fleeing onto the ship to escape the cops, kicking off the captain and seizing command. With him are accountant Jake Hinch and several suitcases full of bottles.

Meet Rima Virili, scientist and mother, son Kip, addicted to his Captain Cometeer game, and daughter Day, who must leave her stuffed panda Me-Me behind.

And they're off, the bomb defused, Carlos and Roak in the brig, a dead star looming ahead, a world frozen near absolute zero near as long as Earth has existed, gigantic ruins flashing rainbow rings to frighten Stecker and Hinch. Roak insinuates himself into Stecker's graces. Carlos makes himself useful, befriends Kip, yearns for Rima. Hinch forces himself onto an expedition to examine the ruins and dies. Day insists that Me-Me is out there in the cold and dark, calling her, attempting to leave the warm ship without a protective suit. There are signs of survivors from ancient, ancient eras—flashing lights, strange

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stones that give nightmares and visions, crewmembers wandering suitless across the frozen vacuum and surviving for surprising times.

And . . . well, it's not a complex tale. It's predictable to anyone with a bit of reading experience. Perhaps it's therefore best suited to younger readers, who necessarily lack that experience. However, that audience demands a greater degree of action and involvement than Williamson here provides. I suspect *Black Sun* will thus fall between the stools and vanish from our ken much as do Williamson's Seedships.

Alan Dean Foster's work is too light to live forever, but it almost always lives up to its purpose of entertainment. **Jed the Dead** is no exception except in the sense that here Foster is even more entertaining than usual.

How could he lose? Texas roughneck Ross Ed Hager gets a yen to see the Pacific and hits the road. At a highway rest stop, he climbs a hill, spots a cave, and discovers a three-eyed, six-limbed dead alien—Jed—whose space suit has the power to bestow a virtual tour of the universe and repel hostile forces. It also makes Ross Ed a heck of a ventriloquist when he takes a temp job as a bartender, but when Ross Ed spouts the formula for an astonishingly successful rocket fuel, he catches the attention of military intelligence. Soon Ross Ed and Jed are on the run from all the U.S. government's armed forces. They fall in with saucer nuts and Hollywood, are captured by live aliens who call Jed a criminal and reveal that even if Jed is dead, enough of his mind has been preserved by the suit that he's really still there, and escape only to fall in with Mexican rebels, a drug lord, and more aliens.

You get the picture. Lots of fun, and if there's a serious bone in the corpse it is that Jed has a little something in common with Salman Rushdie.

It had been a little while since I had seen anything new from Mike Resnick. I figured he was busy, for I knew he was working on the scripting of *Santiago* for Hollywood. Still, I missed his unique flavor in my reading.

I needn't have worried. The other day he sent along **The Widowmaker** and its sequel (see below), with word that he and his wife, Carol, are already scripting it for Miramax Films; the *Santiago* script should be shooting by the time you read this, and the "Kirinyaga" stories are on the verge of a European cable deal. And yes, he says, he never dreamed back in the days when he was just another collie breeder, that he would or could ever find such success writing SF.

It had to happen, didn't it? Mike makes SF fun, while never forgetting that there needs to be a genuine point to his stories. The movie deals were inevitable, for it is impossible to read a Resnick novel without wishing for popcorn. It's about time the Hollywood moguls realized that. And if the movie-going public agrees—how can they not?—we can look forward to a long string of grand SF films. Just think of how well the "Sideshow" novels would work, and the "Velvet Comet" series. *Adventures* could be a

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TV series. And so on.

What about *Widowmaker*? The setting is Mike's patent galactic civilization modeled on the frontier of colonial Africa (with echoes of our own Wild West). Criminals and lawmen, wenches and mensches, all are bigger than life, and the title character was once the greatest of bounty-hunters. Now, however, he dwells in a drawer, his animation suspended while he awaits a cure for eplasia, a disease that destroys his skin and lets cheekbones and knuckles whitely protrude. Unfortunately, inflation has eroded his fortune to the point where it seems unlikely that he can stay on ice long enough to meet the cure. Fortunately, his lawyer has an offer that may save the day: A planetary governor has been assassinated, and the planetary government will part with a bundle of boodle if the Widowmaker will hunt down the killer.

The Widowmaker himself isn't really up to the job, but strings are pulled. A thoroughly illegal clone is prepared, trained, and sent forth. Unfortunately, the clone's apparent age is a stripling 23, the Testosterone Kid, and while he is the best there is with hands and weapons, he has a tendency to pant and drool at the sight of a blue-skinned maid. This, of course, is his undoing; a hero needs not just a deft hand with a popgun, but also self-control and judgment.

The original Widowmaker remains in his drawer. Even though his clone came to a bad end, his reputation has been enhanced. More offers come in, and money is still needed to ensure his survival until his disease can be cured. Another clone is in order, this one vat-raised to an apparent age of 38, trained as before, but also equipped with the original's memories. This one has self-control and judgment. Evil-doers beware, for now they really do face **The Widowmaker Reborn.**

This time the mission is to hunt down the revolutionary Ibn ben Khalid, who has kidnapped Cassandra Hill, a tyrant's daughter. The new clone begins by evening the score left unpaid at the end of the previous novel. He then recruits an empathic whore (to tell him when people are lying to him) and an alien who is happiest when blowing up Men. Soon thereafter, he succeeds in tracking down his prey, realizes that the situation is a bit more complicated than it was billed at first, and chooses a new target: Cassandra's evil Papa, surrounded by zillions of troops, indestructible robots, and security defenses that just aren't in the Widowmaker's outdated memories.

Does the Widowmaker survive this time? I'll leave that to you to learn for yourself. Suffice it to say that the original remains in his drawer still, and a cure for eplasia is imminent. *The Widowmaker Unleashed*, the third volume in the trilogy, will star the Widowmaker Himself. In Mike's own words, "He's 63 years old, way past his prime, and wants nothing more than to retire to a farm and tend his garden. But he keeps running into enemies he didn't know he had and doesn't recognize, enemies the first two clones made." The implicit message is that a complete hero needs not

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only skill, self-control, and judgment, but also knowledge.

Mike Resnick is not only a successful author of SF novels, but also an anthologist and a contributor to the anthologies of others. Many of these projects have been built around themes such as alternate Sherlocks, Dick Tracy, and so on, and some of them have been a great deal of fun.

Mike preserves his own contributions to such anthologies in **Solo Flights Through Shared Worlds**, where you will find the origins of the Dick Tracy comic strip ("Origins") as well as "The Kemosabee," in which you learn that the American Indians were one of the lost tribes of Israel, Tonto spoke Yiddish and schlepped his wounded buddy to Reb Running Bear for healing, the true meaning of "kemosabee" is . . . Well. It has a lot to do with why the reader is rolling on the floor, holding his gut, and laughing, especially after Tonto devises a cutting solution to the Reb's refusal to heal the Lone Ranger twice. Even my 82-year-old Jewish mother-in-law thought it was funny.

Mike Resnick is *good*.

Mike Moscoe's **First Dawn** is a first novel that shows a good deal of promise (two more volumes in the series will be *Second Fire* and *Lost Days,* scheduled for September 1997 and June 1998, respectively). The premise is that civilization is on its last legs. So many tinpot tyrants are making designer plagues to destroy their enemies that every nation is crumbling, and the survivors are tearing the ruins down upon their own heads. The sole exception is a team of scientists who have devised a way to send a pair of soldiers, Jack and Launa, back to the Europe of 4000 BC, when the Old Europeans (according to the team's anthropologists, and according to some real anthropologists) enjoyed a culture based on Goddess-worship and cooperation until the Sky-God-worshipping, mother-raping, baby-bashing horse-riders arrived from the East. Jack and Launa must do their damnedest to strengthen the Old Europeans before they are overrun, to ensure that cooperation and the Goddess will survive to shape the future and that future civilization will therefore not destroy itself.

It's a nice idea, and Moscoe handles it pretty well. Jack and Launa have their very human difficulties, the locals respond to their message in humanly varied ways, and a bit of modern military tactics serves quite nicely to put paid to the marauders. However, *First Dawn* must fail to convince anyone who knows a bit more of prehistory than feminist anthropologists are willing to romanticize. As Elizabeth Hand reminded us in *Waking the Moon* (reviewed here in Mid-December 1995), the old Goddess cults were surely just as bloody-handed as anything the Sky-God cults came up with.

A more trivial difficulty, and one that I expect Moscoe to grow out of as soon as he realizes how it grates, is his tendency to coin names simply by switching letters in modern names, and thus to have characters one cannot mention without mispronouncing. "Launa," for instance, insists on

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coming to the tongue as "Luana," and "Antia" as "Anita."

Rachel Pollack did astonishing and original work in the novels *Unquenchable Fire* and *Temporary Agency*, inventing a sparkling new fantasy scheme and making it work to grand effect. Her latest novel, **Godmother Night**, displays a deft, competent, confident hand that I suspect will wow a great many readers. However, it makes less of an impression on me.

Meet Jacqueline, a misfit young woman who attends a college dance and there meets an older woman who calls her "Jaqe" and introduces her to Laurie. Jaqe, who has always hated her name, feels a thrill of instant recognition for this version of it. There is also a thrill attached to Laurie, chief of the Lesbian Students Union, and very soon Jaqe and Laurie are a pair, coping with all the pangs of lesbian life, including parents who just do not understand. In due time, Jaqe decides she wants a baby, and suitable arrangements—involving a friend of a friend and a turkey baster—are made. The daughter is Kate, the infancy is difficult, and it is not long before Jaqe is out of the picture. Kate calls Laurie Mom, grows up, finds her calling and a love of her own, and . . .

Where's the fantasy? Who was that older woman, associated with the labyrinth, accompanied by motorcycling redheads? Mother Night, the Gram Reaper if you please, Goddess of Death. She has an interest in Jaqe and Laurie, and when Laurie accepts her as Kate's godmother, in the child as well. Kate grows up accustomed to seeing the dead wandering in the streets, thinking of death as something one can bargain with, manipulate, much in the style of a million daily prayers along the lines of, "Oh, please! Let her live! Take me instead!"

There is immense potential for tragedy here, which Pollack does not evade. Unfortunately, it is the nature of this tragedy that leaves me dissatisfied. Everyone knows that those daily prayers are futile, doomed never to be satisfied, knowledge underlined by fairy tales out of the past. It is thus very difficult to believe in Mother Night and her world, and thus in Jaqe, Laurie, Kate, and that world's other citizens.

On the other hand, Pollack is also doing something else here, and that is something that impressed me more. In the lives of her lesbian characters—especially Laurie, in and around the time of Kate's birth—she demonstrates that sexual preference is by no means the only or even the chief determinant of a person's nature. Laurie responds to her partner's pregnancy and to the post-partum change in the conditions of their life together in very much the same way that a man does. In other words, homosexuals are not really very weird folks; they're just like us. For a subtext, remember that Laurie is a woman; despite all the rhetoric about men from Mars and women from Venus, says Pollack, women respond just like men when they find themselves in situations more commonly associated with men's lives.

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What is this book's audience? I suspect politically correct lesbians will love it—it has New Age anti-patriarch womyn power and some fairly explicit sex, too—but the stern and disapproving straights might benefit from it more. Both groups will gain from the reminder that men and women are less different than we often prefer to believe. ■

IN TIMES TO COME

Our next issue is our July/August "double" issue, offering roughly twice your usual serving of the things you read *Analog* for. Kelly Freas, the "Dean of Science Fiction Artists," has the cover, for "Sam Boone's Dry Run." Yes, it's another tale of that notable interstellar negotiator, this one featuring at least as zany a cast of aliens as any preceding, and a stronger element of mystery than most. (And a very sneaky mystery it is, too!) We're also extremely pleased to offer a major new novella from Timothy Zahn, an *Analog* protégé who used to be one of our most prolific and popular contributors, but lately has been too busy with books to be able to write much short fiction. Since this is his second *Analog* appearance this year, we can hope he might be coming back a bit more often. This one, too, has an element of mystery, and a new, very different species of deep space dwellers.

We'll also have an impressive debut or two, plus additional fiction by such favorites as Rick Shelley and Jerry Oltion; and one of those somewhat heretical fact articles *Analog* readers tend to favor. A while back I did an editorial pointing out that despite the fact that many scientific circles slammed the door on "cold fusion," perhaps as prematurely as the first experiments were publicized, a good many quite reputable researchers are still looking at that type of phenomenon—and getting results. Dr. Eugene F. Mallove, perhaps best known to some of you as coauthor of *The Starflight Handbook,* now edits a whole journal devoted to such research, and in our July/August issue he offers an overview of what's going on, with lots of references that you can check out for yourself. It may or not be "cold fusion," but it seems pretty clear that *something* new and different—and quite possibly very important—is going on!

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BRASS TACKS

Dear Dr. Schmidt,

John K. Gibbons's story "Voice of the People," in the November issue, was an interesting one. It's not often that one sees a good political science fiction story. It does repeat, though, an idea that is commonly heard, but which I believe to be an error, that "Gorbachev brought down a huge imperial power and destroyed its ideology."

I remember seeing a brief piece in *The Daily Telegraph* (of London) in about 1970, which said that at the present rate of increase of the Soviet civil service administration, within twenty years it would absorb the entire population. Obviously that would not happen, but what it really means is that the Soviets were trying to do something for which they had not the resources and could not have the resources, and therefore administrative collapse could be expected in twenty years or so; which is exactly what happened. The actions of Gorbachev, or Reagan, made only marginal differences.

The story, of course, made a similar point in a different way, that there is only so much control possible of a large system, and failure is bound to follow dependency on more than that much. The founders of Virginia knew that when they wrote their constitution to match their powers of enforcement. There is no point in the waste of spirit and expense of shame in getting upset about what cannot be controlled. The interesting point, again as Gibbons's story showed, is what may happen when a greater degree of control becomes possible.

RODERICK REES

Woodinville, WA

Dear Stan:

"Fugue on a Sunken Continent" (November 1996) includes an extremely detailed and realistic depiction of a complex alien world and its inhabitants. While these aspects of the story were fascinating in themselves, I found the story's references to the music of Johann Sebastian Bach (1685-1750) equally interesting.

As was pointed out in the story, the composer's last name can be expressed by the notes B-flat, A, C, and B-natural—the latter note being used as "H" in German musical usage. Thus, for example, in German the title of Bach's Mass in B minor is "Messe in h-moll." This four-note motif based on Bach's name was actually used by the composer himself in his

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Art of Fugue, and as a homage to him by later composers. Beethoven wrote a canon employing the "B-A-C-H" motif, and pieces using it were also written by Robert Schumann, Franz Liszt, Nikolay Rimsky-Korsakov, Arnold Schoenberg, Anton Webern, and others.

Fugue, a contrapuntal compositional technique or form which Bach used to write many masterpieces, is a term derived from the Latin fuga, or "flight." The story involves a great deal of flight by both humans and Epona's sentient species, the Uthers, in both the literal sense of "flying," and also "escape." In fact, the overall layout of the plot is reminiscent of the structure of a fugue. In the latter, one or more themes are played by different independent musical lines ("voices"), and return in the same or subtly varied forms and settings throughout the composition. In the story, the recurring themes of the two main human characters either being involved in flight of one kind or another, or being captured by hostile Uthers, also seem to be used in this same way.

Finally, the story also contains a reference to a work by another composer whose name is associated with J. S. Bach. On the sunken continent of the story's title is a place called "Fingal's Cave." Felix Mendelssohn (1809-47) wrote a well-known programmatic work in B minor after visiting a place by that name in Scotland—an orchestral piece known as the "Fingal's Cave" or "The Hebrides" overture. Mendelssohn played a critical role in reviving public interest and awareness of J.S. Bach's music. Late 18th- and early 19th-century composers like Haydn, Mozart, and Beethoven were familiar with many of Bach's works and recognized his genius. However, the composer's music was little known by the general public and almost never performed in concerts until, in 1829, Mendelssohn conducted the first performance since Bach's death of the *St. Matthew Passion.* It was largely through Mendelssohn's efforts that the so-called "Bach Revival"—the widespread rediscovery of the composer's oeuvre and recognition of his unrivaled mastery of counterpoint—was successful.

In short, "Fugue on a Sunken Continent" works well as an exercise in both science fiction and music. I'm looking forward to reading more stories about Epona, the planet created by the CONTACT group, in future issues of *Analog.*

HENRY G. STRATMANN

Dear *Analog,*

Reading your essay/editorial this afternoon (as soon as I received my copy of the November *Analog*), I was struck by a similarity between your thoughts and those of Stephen Jay Gould in his essay, "In the Mind of the Beholder," in which he parenthetically commented: "The myth of a separate mode based on rigorous objectivity and arcane, largely mathematical, knowledge vouchsafed only to the initiated may provide some immediate benefits in bamboozling a public to regard us as a new priesthood, but must ultimately prove harmful in erecting barriers to truly friendly un-

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derstanding, and in falsely persuading so many students that science lies beyond their capabilities." (The essay is included in his book *Dinosaur in a Haystack*.)

Perhaps many people today regard scientific achievements as "magic" because that's what (some of) the scientists *want* us to think?? As a senior citizen, I never would have gotten into this computer thing had I not had a computer-literate grandson, and a computer-literate friend, both of whom thought I was smart enough to learn my way around in the computer world. Two years ago, I had never even accessed a computer—now here I am sending you an e-mail!! Will wonders never cease !!

Thoroughly enjoy every issue of *Analog*—particularly your essays.

PEG SNYDER
nanasnyder@worldnet.att.net

Dear Stanley Schmidt:

Your editorial in the November 1996 issue is entitled: "The Dark Side of Clarke's Law." You might find it interesting to read what L. Sprague de Camp has to say in *The Ancient Engineers: Technology and Invention from the Earliest Times to the Renaissance*. The original copyright is 1960, but Barnes & Noble brought it out again in 1993.

In Chapter 7: "The Later Roman Engineers," around page 255, de Camp is addressing the decline of science. He lists the many interests competing for attention, and it begins to sound familiar. He goes on to say:

"Credulity they redefined as 'faith,' and fanaticism as 'zeal,' while respect for the laws of cause and effect was condemned as 'blind materialism.' . . .

"As a result, the world witnessed a great 'return to religion.' The new cults grew swiftly. The old Greek and Roman polytheisms, with no central organization, no theology but a mass of childish and inconsistent myths, and no particular doctrine of the future life, crumbled before the tide. The worship of Kybele, Mithra, Isis, Yahveh, Serapis, Abraxas, and Christ waxed mighty. The magical cults of the Neopythagoreans, the Neoplatonists, and the Gnostics throve. The pseudo-science of astrology flourished, and hedge-wizards like Simon Magus swarmed. . . .

"Who wanted to spend years in pursuit of some obscure natural law, or pay somebody else to do so, when by joining one of the new cults you got drama, passion, mystery, a feeling of superiority to all non-members, and a promise of eternal bliss in heaven?"

The possibility that it has happened before is not reassuring.

Thanks for encouraging us to think about it.

LAURA H. WISE
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Dear Mr. Schmidt,

In your latest editorial, "The Dark Side Of Clarke's Law," you point out what a terrible lack of understanding of science the average person has today. I could not agree with you more. May I offer a simple, but unfortunately impossible, solution. A law: "If you can't fix it, you can't have or use it." Even if you substitute the word "un-

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derstand" for the word "fix," you give people a powerful incentive to learn.

One added bonus, people would not be as likely to be "ripped off" when they went to have some device repaired. How many people have you heard complain about the price of having something fixed?

CESAR LAZARICH
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Dear Dr. Schmidt,

After reading the November 1996 Brass Tacks, I had to add my two cents to the comments on "Big John." The song was written and sung by Jimmy Dean (of later pork sausage fame), entered the top 100 (pop charts) the week of October 10, 1961, and remained there sixteen weeks, five at the number one position. For those wishing to know such (usually nonessential) facts, I would recommend Joel Whitburn's "Top Pop Singles 1955-1993." As to the two versions of the song, both my wife and I remember hearing a version ending "one hell of a man," but Whitburn lists only one 45 issued and our copy of that record ends "a big, big man." However, on the *Music City Tonight* show that aired September 29, 1995 (a tribute to Jimmy Dean hosted by Crook and Chase), Jimmy sang the "one hell of a man" version, which suggests there were indeed two versions issued. Tennessee Ernie Ford, by the way, had a number one hit in late 1955 with "Sixteen Tons," also about a tough miner, hence the confusion.

I would also like to express my agreement with your November editorial contention that a large part of the population regards our current technology as equivalent to magic. This extends to basic math as well. Although I have a B.A. in math, I haven't used most of it in so long that all I really can claim is a good knowledge of basic algebra. At work, though, this qualifies me as a genius-level math whiz to most of my coworkers. Far too many decisions about our future are being made by people who have no grasp whatever of the existing technology which will shape that future, much less what kinds of technology will be possible very soon.

Before I go, I'd like to say how much I enjoyed "Starplex," and enter a brief plea for more stories by Robert J. Sawyer and some of my other favorite authors: Maya Kaathryn Bohnhoff, Lois McMaster Bujold, and Grey Rollins. Keep up the good work.

MARK MCLELLAND
Topeka, KS

Dear Dr. Stanley Schmidt,

As a longtime fan of science fiction and a reader of *Analog* for over thirty years, I wished to express my appreciation for your work and that of your predecessors in maintaining the high standards of *Analog*. Science fiction has been enriched by the presence of this magazine serving as the preeminent monthly magazine in the field. Thank you.

One of the features I enjoy, despite the time-lag problem, is The Reference Library. Several times, this section has alerted me to obscure books

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I might not have recognized as worthwhile without the notice. Recently, in the September 1996 issue, I was treated to a review by you of such a book. The book is *Proximity Zero* (2nd Edition): *A Writer's Guide to the Nearest 200 Stars* by Terry Kepner. Even though I am not a writer, I was so interested that I mailed a request for two copies of the book to the address listed for The Bob Liddil Group. I was very disappointed to have my letter returned "MOVED LEFT NO ADDRESS." I had hesitated in sending my order until I returned from a two-month overseas business trip. and I guess things changed in the interim. Things do.

Another feature I enjoy is the Science Fact section. Over the years, I have been amazed and enlightened by this feature. By covering both sides of the line between science fiction and science fact, *Analog* adds to the understanding of its readers of the connection between dreams and accomplishments.

As always, I am looking forward to receiving your next issue. I am sure it will measure up the fine heritage of this magazine. Again, I wish to thank you for the years of enjoyment in the past and, I hope, the many years of the same in the future.

TERRY P. DEAN

Bay St. Louis, MS

According to our latest information, the correct address for ordering Proximity Zero is Terry Kepner, P.O. Box 428, Peterborough, NH 03458. The price of $22.95 includes second day priority mail service. Mr. Kepner also has a web page describing the book: www.peekaboo.net/tkepner/proximityzero.html

Dear Dr. Schmidt,

I am a longtime subscriber. I consider *Analog* not just another magazine, but an important advocate for a rational point of view, as I suspect many other readers do too. The stories I find in *Analog* satisfy both emotionally and intellectually in a way I can't find in other popular media. That's why several trends have saddened me. The first is the disappearance of *Analog* from the magazine racks. I remember a time when large grocery stores displayed *Analog.* Now, even the Barnes & Noble superstores seem to have banished *Analog,* while they stock esoteric magazines about raising parrots and the like.

How can we bring new people into the fold, when newbies don't know what's out there? The second, perhaps related trend, is a year by year gradual decline in *Analog's* subscriber base as published in your postmaster's legal notices. Although the quality of the magazine continues to be top rate, no magazine can have its circulation fall forever, and double issues can never make up the revenue loss. Besides, no matter what the circulation, I think I would always like to expose as many people as possible to *Analog's* solution finding philosophy.

Why not throw open a challenge to the many readers who love this magazine and who, like me, take a proprietary interest in its long term health?

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Surely, with the many fine problem solvers among the readership, we can come up with some worthwhile suggestions and submit them to your business office.

My own suggestion stems from how I got hooked on *Analog*—in high school from my friends. Perhaps *Analog* should make an effort to be included in high school (and junior high) book fairs. (Do they still have them these days?) *Analog* could get the most bang for its marketing buck by reaching young readers with as yet unformed reading habits. I believe that when you're hooked on ***Analog,*** you tend to subscribe for life. I seem to recall results from a readers' survey you published a while ago describing most readers as long time subscribers. Teachers among the readership could offer suggestions on this.

I also remember an excellent letter from someone suggesting that readers donate a subscription to their local library when they renew their own subscription, something I will try when my subscription renewal comes due. Perhaps there are other ways to expand the magazine's exposure and potential readership. I know this is not the sort of appeal an editor could make directly to the readership, but you can publish my letter and see what people have to say.

DAVID HITCHCOCK

Plainsboro, NJ

We're hoping the new publisher will be able to improve things (for starters, you should soon be able to find us in at least many Barnes & Noble stores), but we always welcome good suggestions from readers!

Dear *Analog,*

The current issue of *Analog* has a feature that is disconcerting to me, and probably to many other readers. It is the placing names of authors on odd-numbered pages in place of titles of stories.

When reading a story, I like to lose myself in the story, not in the identity of the writer. And when I lay the magazine down and then pick it up and look for my place, it's a lot easier to find with the story title on the pages. A story title fits the story; the writer's name does not.

Also, the names are in such a large type-size that they draw the eye away from the story.

The new form may please some authors, but if I had written one of the stories, I'd rather please the readers than just have a boost to my ego.

Maybe the idea is to make sure readers know whose stories they like. But, as a reader, I'd be more inclined to have a favorable impression of a writer without having his name drummed at me.

One alternative would be to put both author's name and story title, in much smaller print.

J. A. COFFEEN

INTERNET:JACoffeen@aol.com

As with most things, it's impossible to satisfy everybody! We decided to try this experiment in direct response to letters from other readers who suggested it because they had little trouble remembering what story they

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were reading, but wanted an easy way to see whose work they were enjoying (or hating) without turning back to the beginning. How we do it in the long run will depend on expressed reader preferences, so if you have one, by all means let us know!

Dear *Analog*,

On page 141 of the January 1997 *Analog*, the ISBN of *Children of the Mind* by Orson Scott Card is given as 0-312-85395-3.

I tried to order the book from the Publisher's Book and Audio Mailing Service at 1-800-288-2131 in New York.

After some confusion, the person there said that the correct ISBN is 0-312-85395-5. This is also the number in http://www.amazon.com/

Keep up your good work, this is just a trifle.

BRIAN DOHERTY
bfdoherty@earthlink.net

Dear Dr. Schmidt:

Carrie Martin's letter in the January 97 issue states that ". . . greyhounds retired from racing . . . make excellent pets, but they can't navigate stairs." I have a close friend who lives in a two-story house and owns two retired racers, Catch-22 and Precious Girl. Catch retired young because she was "slow," but Precious ran for several years. Neither dog ever had any difficulty negotiating the stairs in about 3-4 seconds up or down, although Catch is now one or two seconds slower since she had a tumor in the shoulder of her left foreleg a couple of years ago and had to have the leg removed.

I'd hate to see this misconception perpetuated, as it might discourage people living in multi-story homes from adopting retired greyhounds, because they do make excellent pets and deserve to retire in luxury rather than being exterminated when they can no longer race. Incidentally, the retirement program is not only in Arizona, but in Texas and other states, and one program I know of is called Adopt-A-Greyhound.

JOSEF D. PRALL
72763.1154@compuserve.com

[I have a special empathy for them as I retired from my job as a Senior Forensic Chemist with the Drug Enforcement Administration in mid-December last year and am enjoying my new career as a Scuba Instructor with a Civil Service Retirement System cushion, rather than having been gassed at the end of my usefulness to the U.S. government; so far at least, Soylent Green is not former government employees.] ■

Erratum

On page 37 of the February 1997 issue of *Analog*, Chapter 11 of "Broken Symmetry" should be headed "Spin Up."

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UPCOMING EVENTS Anthony Lewis

23–26 June 1997
Science Fiction Research Association/Eatoncon (academic SF conference) aboard *Queen Mary,* Long Beach, Calif. Theme: Exploring the Space/Time Continuum of Science Fiction and Fantasy. Guests: Brian W. Aldiss, Gregory Benford, Michael Cassutt, David Brin, David Pringle, Kim Stanley Robinson, etc. Info: SFRA/Eatoncon, c/o/ Gladys Murphy, Rivera Library, UC Riverside, Riverside, CA 92521. (909) 787-3233. email: gladys.murphy@ucr.edu

26–29 June 1997
DRAGON*CON '97 (Atlanta area multi-media conference) at the Inforum and Hyatt Regency, Atlanta, Ga. Guests: Kevin J. Anderson, Matthew J. Costello, Raymond E. Feist, Mercedes Lackey, F. Paul Wilson, Bernie Wrightson, etc. Registration—$50 until 15 May 1997, $60 at the door. Info: Dragon*Con, Box 47696, Atlanta, GA 30362. (770) 925-0115 (business hours ET, M-F), (770) 925-2813 (24 hrs). email: digest@dragoncon.org url: http://www.dragoncon.org

3–6 July 1997
WESTERCON 50 (western North America SF conference) at Sheraton Seattle Hotel & Towers, Seattle, Wash. Guests of Honor: J. Michael Straczynski, Martin Harry Greenberg, Amy Thomson; Artist Guest of Honor—Victoria Posner-Lisa; Science Guest of honor—Jack Cohen; Music Guests of Honor—Jeanne and Spider Robinson; Fan Guest of Honor—Walter Daugherty. Registration—$40 until 30 June 1997, more thereafter and at the door. Info: SWOC, Box 283, Seattle, WA 96111. email: westercon50@isomedia.com

28 Aug–1 Sep 1997
LONESTARCON 2 (55th World Science Fiction Convention) at San Antonio Convention Center, San Antonio, Texas. Guests of Honor—Algis Budrys and Michael Moorcock; Artist Guest of Honor—Don Maitz; Fan Guest of Honor—Roy Tackett, TM—Neal Barrett, Jr. Registration $135; supporting $25; children +3 to +12 $40, children -0.75 to +3.0 FREE (age as of 29 August 1997). This is the SF universe's annual get-together. Professionals and readers from all over the world will be in attendance. Talks, panels, films, fancy dress competition—the works. Info: LoneStarCon 2, Box 27277, Austin, TX 78755-2277. (512) 435-7446 (voice), (512) 435-7747 (fax), lsc2@io.com

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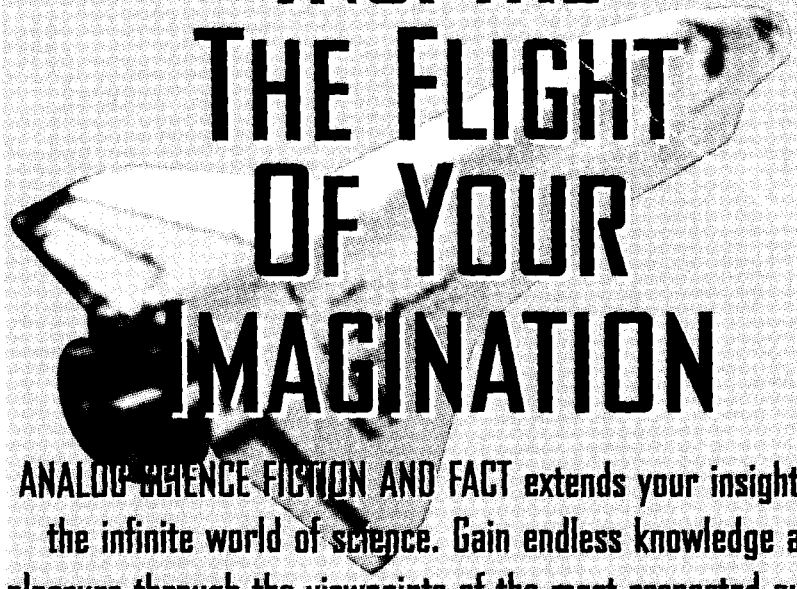

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TECHNOLOGY UPDATE

Fifteen years of microelectronic research makes conventional antennas a thing of the past!

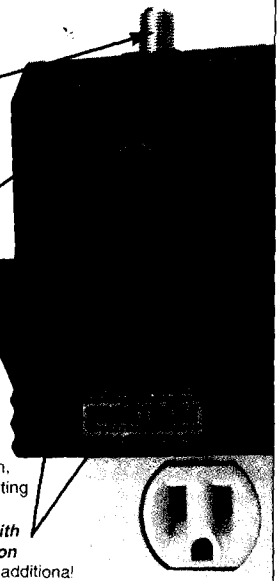
This little box uses your home's electrical wiring to give non-subscribers, cable subscribers and satellite users better TV reception on local broadcast networks!

Thanks to 15 years of microelectronics research, a new device has been developed that is so advanced, it actually makes conventional antennas a thing of the past. It's called the Spectrum Universal Antenna/Tuner.

Advanced technology. If you live in a rural area, you may have simply accepted the fact that your local TV reception is poor. This may be true even if you *don't* live in a rural area! Imagine watching TV and seeing a picture clearer than ever before. Plug your TV into the Spectrum Antenna and get ready for great reception—your TV will suddenly display a clearer, focused picture.

Uses your home's electrical wiring. The Spectrum Antenna plugs into a standard wall outlet. It turns the electrical wiring in your house or apartment into a multi-tunable TV antenna that will improve your TV's tuning capability.

Rural areas. Most TV signals in rural areas are weak, making them harder to fine tune. The "Gain Booster" is designed to increase the output level of the signal entering your TV, delivering a 10-fold greater signal. By using the Gain Booster, Spectrum's fine tuning controls will function better, giving it a stronger signal to tune. It also works in conjunction with your outdoor antenna!



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For selecting multiple antenna configurations

Resonant fine tuner control
For dialing in crisp, clear TV/stereo reception, eliminates ghosting

Dual outlets with surge protection
For plugging in additional TV/stereo equipment, guarding against damage and surges

Try it risk-free. The Spectrum Antenna comes with our 90-day risk-free trial and a 90-day manufacturer's warranty. Try it yourself, and if you're not satisfied, return it for a "No Questions Asked" refund.

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